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MONTANA FISH AND GAME DEPARTMENT ENVIRONMENTAL IMPACT STATEMENT

ANNUAL STATEWIDE HARVEST OF UPLAND GAME BIRDS

Project No. FG-21

Prepared in Accordance with
Procedures for Compliance with
Environmental Impact Statement Requirements,
State and Federal

August 7, 1972

Game Management Division
Montana Fish and Game Department

TABLE OF CONTENTS

		Page
I.	OBJECTIVE AND PURPOSE	1
II.	DESCRIPTION OF PROJECT	3
III.	DESCRIPTION OF EXISTING ENVIRONMENT	7
	A. Human Resources	8
	B. Physiography and Geology	9
	C. Land Use and Ownership	12
	D. Wildlife -- Upland Game Birds	15
	E. Vegetative Resources	22
	F. Climate	24
	G. Transportation Systems	27
IV.	EVALUATION OF ENVIRONMENTAL IMPACT	32
	A. Environmental Impact of Proposed Action	33
	1. Air	33
	2. Soil	33
	3. Vegetation	34
	4. Water	34
	5. Visual Appearances	34
	6. Sounds and Smells	35
	7. Human Health	38
	8. Wildlife	42
	B. Adverse Environmental Effects Which Cannot be Avoided	42
	1. Air	42
	2-3. Soil and Vegetation	42
	4. Water	42
	5. Visual Appearances	43
	6. Sounds and Smells	43
	7. Human Health	44
	8. Wildlife	44
	C. Alternatives	47
	D. Short-Term, Long-Term Use	47
	E. Irreversible and Irretrievable Commitment of Resources	47
	F. Discussion of Problems and Objections by Other Agencies or the Public	47

V. BENEFITS 56

VI. SUMMARY STATEMENT 62

VII. MAILING DISTRIBUTION 65

APPENDIX (Literature Cited and Other References) 68

I. OBJECTIVE AND PURPOSE

MONTANA FISH AND GAME DEPARTMENT ENVIRONMENTAL IMPACT STATEMENT

STATEWIDE UPLAND GAME BIRD HUNTING SEASONS

OBJECTIVE

The Fish and Game Department has the responsibility for protecting and perpetuating the State's fish and wildlife resources as well as providing for the wise utilization of these renewable resources. Major utilization of the State's upland game bird resource is obtained through regulated recreational hunting. *Objectives* in setting proper game bird hunting seasons include: 1) providing sustained, annual harvests consistent with the biological limits of the species, and 2) providing the public the maximum quality and quantity of hunting recreation that is in harmony with other land uses.

PURPOSE OF STATEMENT

The intent of this Statement is to review expected or possible effects of the annual statewide harvest of upland game birds on the quality of the environment in Montana. In compliance with the Montana Environmental Policy Act, this Statement has been prepared to report the following aspects for public review:

The environmental impact of the proposed action.

Any adverse environmental effects which cannot be avoided.

Alternatives to the proposed action.

The relationship between local, short-term use of man's environment and the maintenance and enhancement of long-term productivity.

Any irreversible and irretrievable commitments of resources which would be involved in the proposed action.

II. DESCRIPTION OF PROJECT

DESCRIPTION OF PROJECT

Harvests of upland game birds are obtained during annual hunting seasons set by the Fish and Game Commission under its authority by Montana Law (Section 26-104, Montana Fish and Game Laws). Enactment of a hunting season by the Commission allows the legal taking of game birds by properly licensed persons within specific time periods and areas. This enactment does not provide authority for entry into public or private lands, except those lands administered or controlled by the Commission. It is the prerogative of the landowner or land-administering agency to prohibit trespass on lands in their control.

When fire danger becomes so extreme that the Governor of the State of Montana, upon the advice and recommendation of the Montana State Forester, closes an area to trespass because of fire danger, that area shall automatically become closed to any hunting or fishing and shall remain closed so long as the fire closure remains in effect (Section 26-345, Montana Fish and Game Laws). County Commissions can request fire danger closures through the State Forester. The Montana Fish and Game Commission has authority to close hunting seasons on a 48-hour notice or by regulation.

The number of people annually participating in upland game bird hunting currently exceeds 60,000. The number of game bird licenses sold during the 1967 to 1971 period included from 59,213 to 63,387 residents (about 1 for each 12 Montanans) and 572 to 1,221 nonresidents (Table 1). Additional bird hunters were undoubtedly among the 13,477 Pioneer (over age 65) and 924 Sportsmen licenses sold in 1971. An unknown number of unlicensed persons, including children

TABLE 1. LICENSED UPLAND GAME BIRD HUNTERS IN MONTANA, 1946-1971.

Year	Resident[1]	Nonresident	Total
1946	140,640	292	140,932
1947	140,327	12	140,448
1948	152,581	163	152,744
1949	160,484	184	160,668
1950	159,284	124	159,408
1951	170,449	216	170,665
1952	183,770	262	184,032
1953	181,560	149	(64,107)[2]
1954	186,395	201	186,596
1955	189,449	242	189,691
1956	191,081	268	191,349
1957	188,898	283	(74,798)
1958	187,949	309	(77,147)
1959	185,727	333	(70,472)
1960	186,969	327	(71,860)
1961	185,719	306	(59,213)
1962	188,898	283	(74,798)
1963	195,847	382	(86,262)
1964	139,464	449	(86,646)
1965	136,755	433	137,188
1966	141,231	433	141,664
1967	61,341	572	61,913
1968	63,387	689	64,076
1969	59,287	792	60,079
1970	59,229	1,046	60,275
1971	59,213	1,221	60,434

[1]Refers to combined Bird Hunting-Fishing Licenses sold, 1946-1963. Includes Bird-Bear Hunting-Fishing and Bird-Bear Hunting Licenses, 1964-1966. Includes Bird Hunting/Adult, Bird Hunting-Fishing/Adult and Bird Hunting/Youth, 1967-1971. Does not include General Sportsmen or Pioneer Licenses.

[2]Figures in parentheses indicate licenses with upland game bird hunting privileges.

under 12, accompany bird hunters on some of the outings. Participants include both sexes, most ages, and probably most occupations from both urban and rural areas. A large proportion of bird hunters typically participate only during the opening day or weekend of the season, thus resulting in greatly reduced numbers of hunters afield on succeeding days of the season. More ardent hunters go afield each weekend of the seasons; a few each day. If all bird hunters hunt at least 1 day, 50 percent hunt 2 days, and 10 percent hunt 3 to 10 days -- the total amount of recreation provided annually would range from three-fourths to over 1 million hours.

Forest grouse hunting usually is open from the second or third week in September until late November and includes large areas of public forests in western and westcentral Montana. Prairie grouse (sharptails and sage grouse) and partridge (Hungarian and chukar) seasons usually open in mid-September and continue for about 2 to 10 weeks in various areas. Prairie grouse are hunted on public and private rangelands and some agricultural areas over much of the eastern two-thirds of Montana. Ringneck pheasant hunting and a second partridge season usually begins in late October and continues for about 1 month. Pheasants are hunted primarily on privately owned agricultural areas except for certain publicly owned shooting areas managed by State or Federal agencies. Hunting of turkeys annually includes a spring gobbler season in some areas as well as an either-sex fall season. Turkey hunters are required to have a special license which is good during either hunting period. However, only one turkey may be taken during any single license year (May 1 to April 30).

III. DESCRIPTION OF EXISTING ENVIRONMENT

DESCRIPTION OF EXISTING ENVIRONMENT

A. Human Resources

Montana's population is unevenly distributed, with the rugged mountainous areas of the west and the eastern plains areas having lowest numbers of people. People tend to cluster in valleys of the west and along major rivers in the east (Figure 1). The 1970 census reported 694,435 people, 47 percent and 53 percent being rural and urban, respectively. The average density was slightly more than four persons per square mile with 54 percent residing in seven counties, six of which are in western Montana (Montana Data Book, 1970).

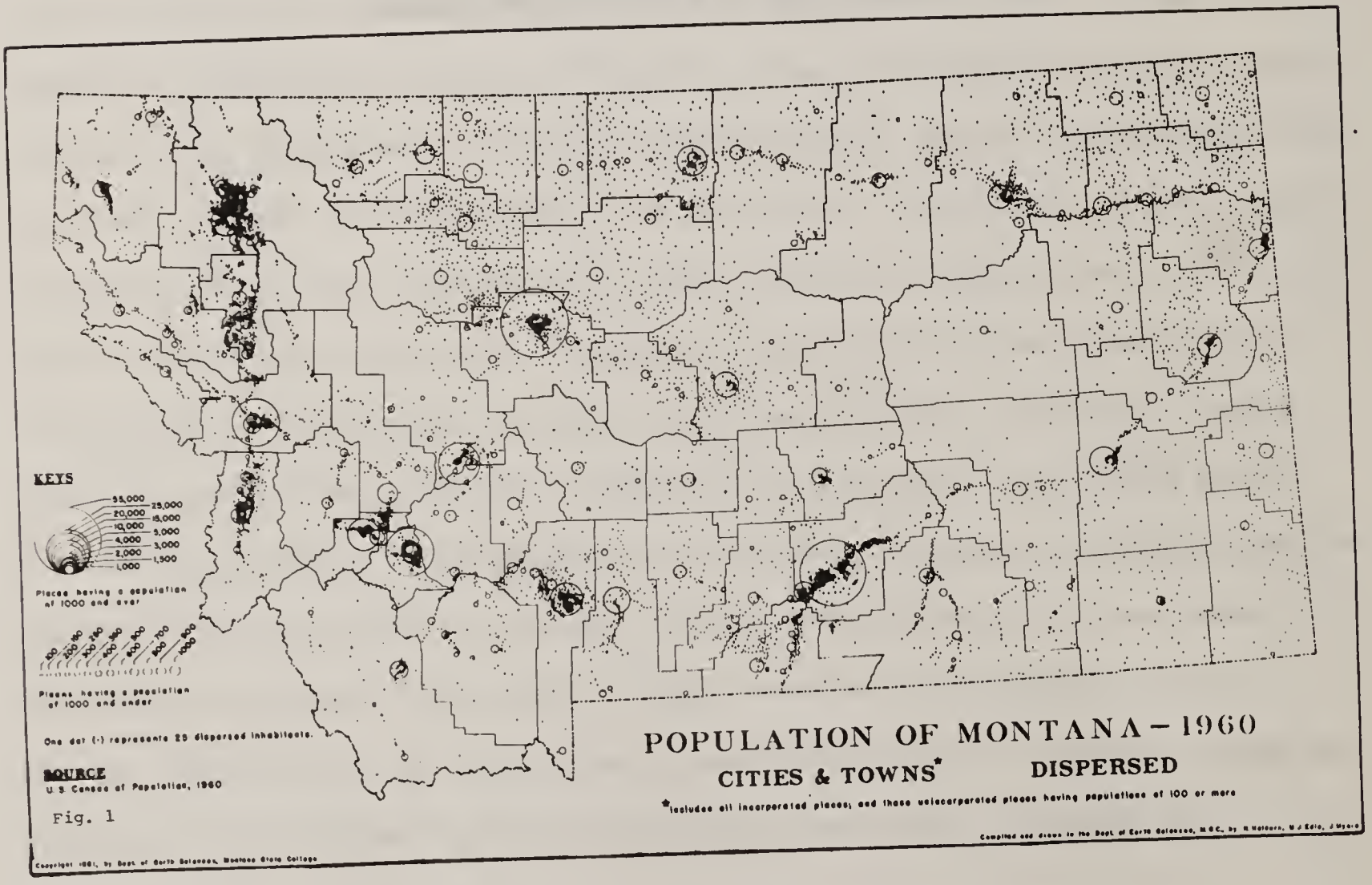


Fig. 1

Approximately 185,600 (27 percent) of Montana's residents participated in some form of hunting in 1971. About one-third of these were licensed upland bird hunters. Approximately 1,200 nonresidents also hunted birds in 1971.

B. Physiography and Geology

Montana is divided into three physiographic areas, Montane, Piedmont and Midland (Figure 2).

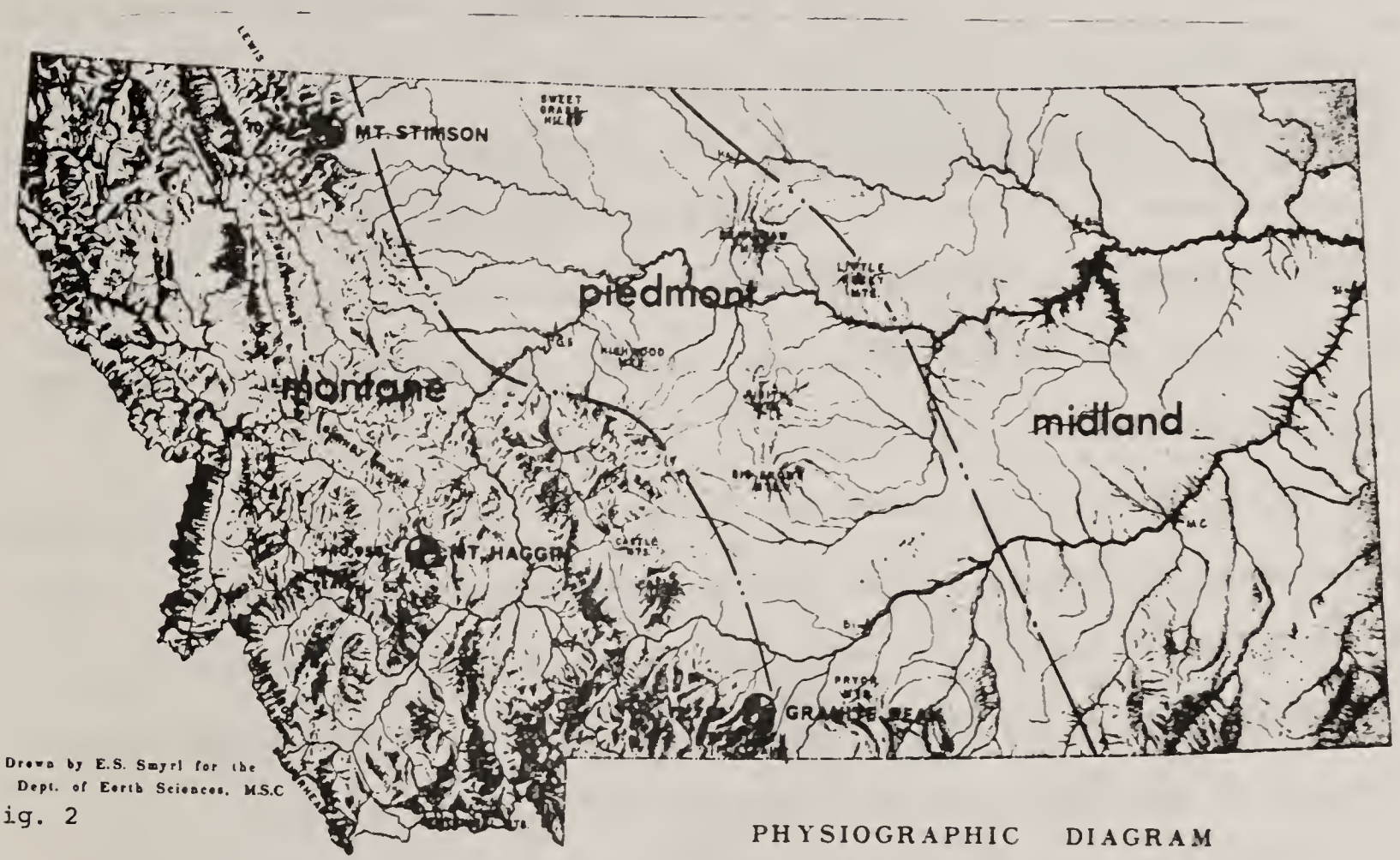


Fig. 2 PHYSIOGRAPHIC DIAGRAM

The western Montane is comprised of the Rocky Mountains which lie in a generally northwesterly direction as a series of high, parallel ranges. Within this rugged, generally forested region are 25 or more ranges between which are located many basins and valleys up to 10 to 20 miles wide and 25 miles long. The highest elevation is 12,850 feet at Granite Peak in Park County near the

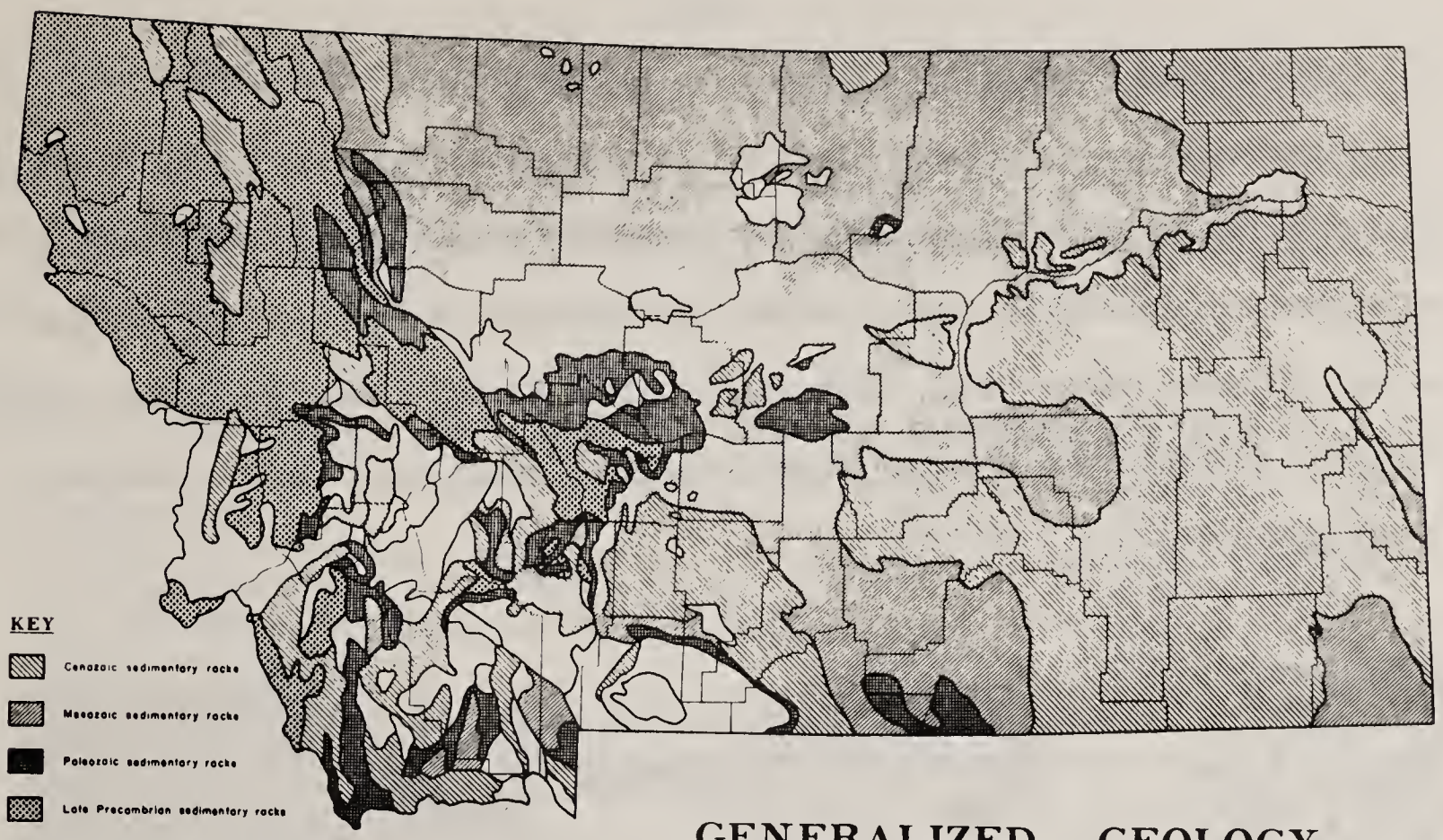
southcentral boundary with Wyoming. In the Montane, elevation, climate, vegetation and soils change abruptly over short distances.

Across the eastern two-thirds of the State are the Great Plains composed of the Piedmont and Midland areas. Commencing as broad Piedmont slopes more than 3,500 feet above sea level, the plains slope gently from the foothills of the Rockies toward the northeastern portion of the State where elevations as low as 1,900 feet occur along the Missouri River. Lesser mountain ranges occur as islands within the Piedmont. Abrupt changes in soils are related to elevational changes within the area. The relatively flat land of the Midland is an extension of the interior continental plains characterized by broad, fertile valleys paralleled by back-stepped benches and bluffs. Changes in soil, climate, and vegetation are more gradual in the Midland area (Southard 1969; Montana Almanac 1959-1960).

Much of Montana is covered with sedimentary rocks (Figure 3) predominantly sandstone, siltstone and shale. All of eastern Montana is underlain by thousands of feet of sedimentary rocks, and in most places, lies nearly flat. Sedimentary beds of the Belt Formation cover much of western Montana and are composed of argillite, siltites, quartzite and limestone.

Crystalline igneous rocks are largely concentrated in southwestern Montana (Figure 4) and contain many different materials of varying crystal size. The fine grained igneous rocks are composed of basalt and trachyte and coarse grained granite and quartz monzonite.

Metamorphic rock also occurs in southwestern Montana and consists largely of schist, gneiss and quartzite (Southard 1969).



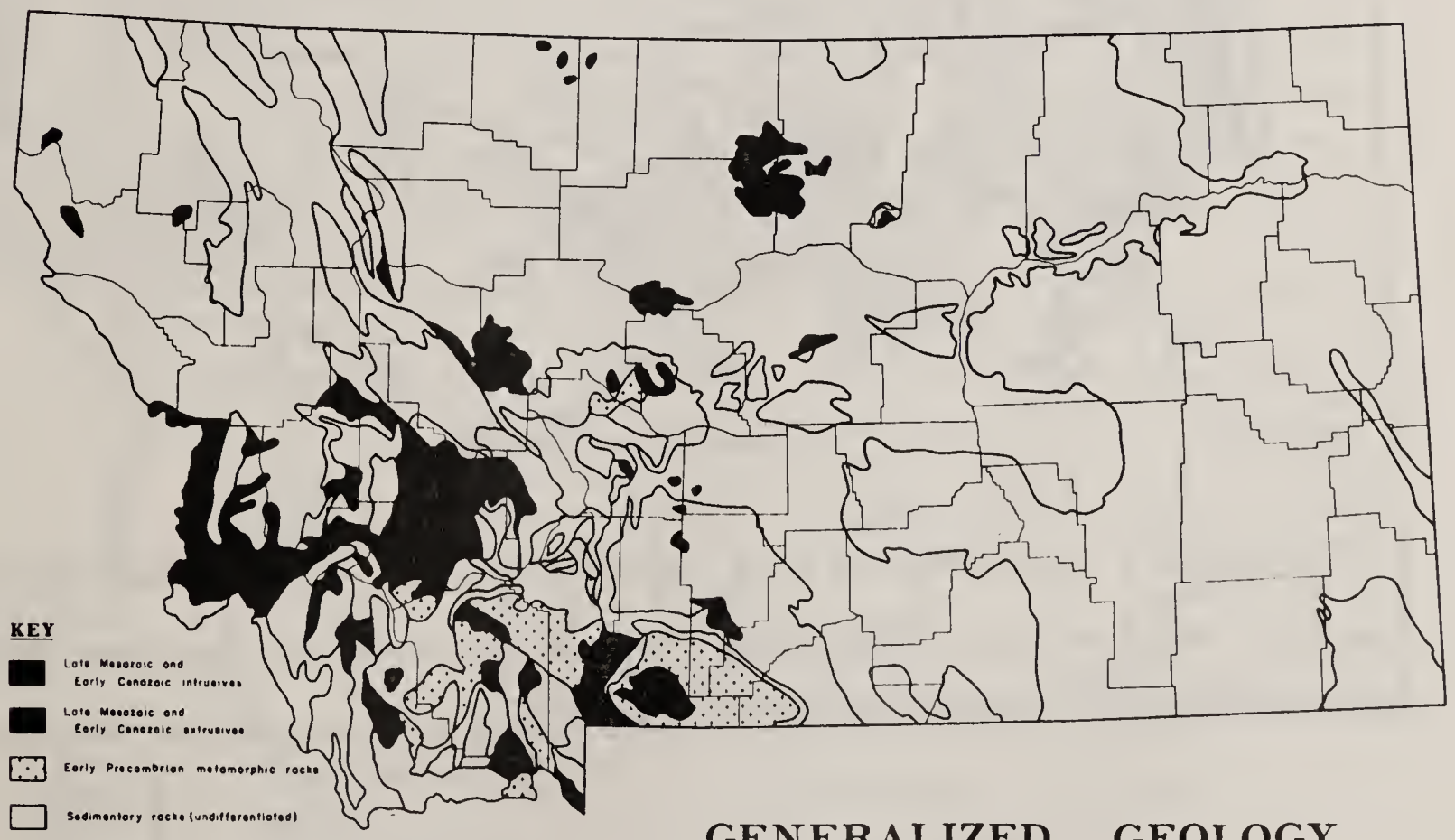
SOURCE

Geology modified from Geologic Map of the US (1932).

U.S. Geological Survey, U.S. Dept of Interior

GENERALIZED GEOLOGY

Fig. 3 SEDIMENTARY


KEY
Late Mesozoic and Early Cenozoic intrusives
Late Mesozoic and Early Cenozoic extrusives
Early Precambrian metamorphic rocks
Sedimentary rocks (undifferentiated)

SOURCE

Geology modified from Geologic Map of the US (1932).

U.S. Geological Survey, U.S. Dept of Interior

GENERALIZED GEOLOGY

Fig. 4 CRYSTALLINE

C. Land Use and Ownership

Approximately 92 percent (86.1 million acres) of the land area in Montana falls in one of these general classes: farming, ranching, grazing, timber, watershed management and recreation. The remaining 8 percent (7.5 million acres) includes waste land, water areas, highways and roads, and urban areas. Figure 5 depicts the types and distribution of major land uses in Montana (Thompson 1956).

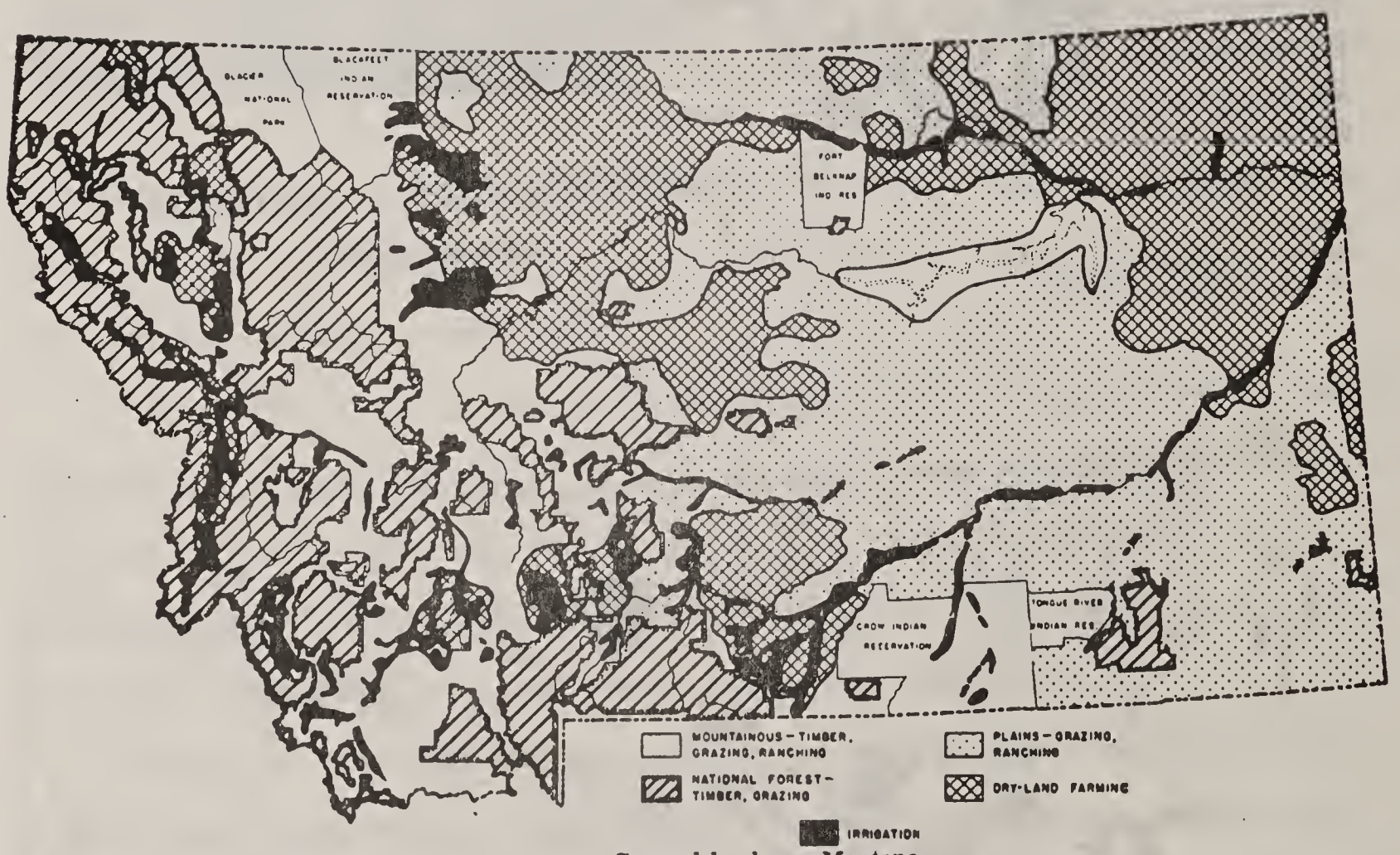


Fig. 5. General land use, Montana.

Agriculture is the leading land use activity, over 60 percent of which is grazing. Likewise, agriculture ranks first as Montana's most important economic activity (Table 2). The two principle commodities are beef cattle and wheat.

The mining-petroleum industry and manufacturing rank second and third ahead of outdoor recreation. The estimate of 145.5 million dollars spent for outdoor recreation in 1969 includes hunting and fishing licenses, sporting equipment, lodging and meals, but not travel costs.

TABLE 2. ECONOMIC RANKING OF VARIOUS INDUSTRIES IN MONTANA FOR 1969.[1]

1.	Agriculture	$647.3 million
2.	Mining and Petroleum	$285.6 million
3.	Manufacturing	$207.5 million
4.	Outdoor Recreation (not including transportation)	$145.5 million
5.	Forest Products	$104.5 million

[1]From Montana Department of Planning and Economic Development.

A large portion of Montana is under public ownership. About 30 percent is owned, held in trust, or leased by the Federal Government (Figure 6, Table 3).

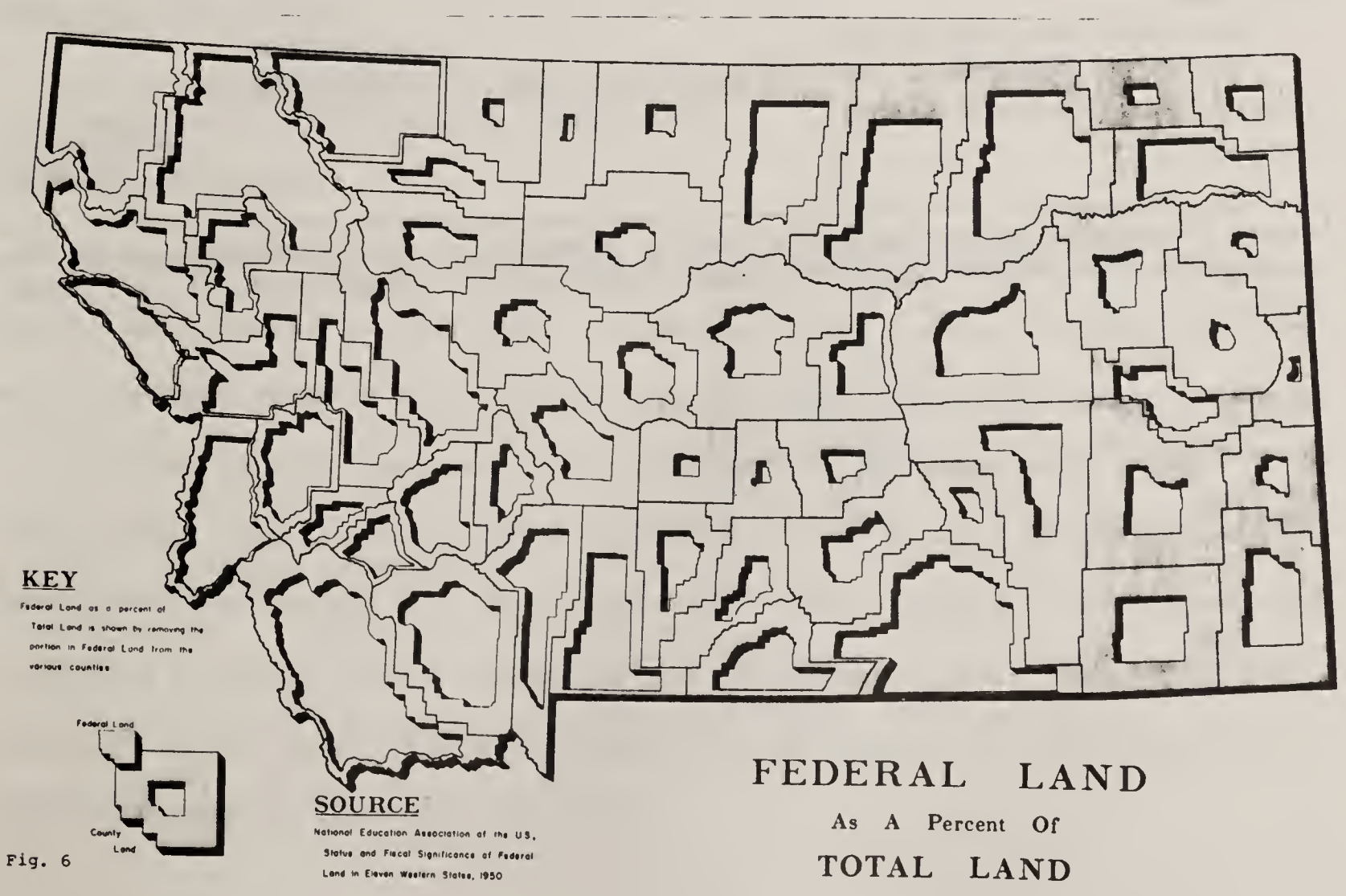

KEY
Federal Land as a percent of Total Land is shown by removing the portion in Federal Land from the various counties
Federal Land
County Land
SOURCE
National Education Association of the U.S., Status and Fiscal Significance of Federal Land in Eleven Western States, 1950
FEDERAL LAND
As A Percent Of
TOTAL LAND

Fig. 6

The U. S. Forest Service and Bureau of Land Management together administer nearly 25 million acres (27 percent) in various categories. State land is over 5 million acres (6 percent). A large part of the State land, much of the land under Forest Service control, and practically all of the Bureau of Land Management land is used for grazing. Other uses include mining, lumbering, and recreation.

TABLE 3. OWNERSHIP OF LAND IN MONTANA, 1970.[1]

Classification	Number Acres	
Federal Land		27,654,289
Forest Service	16,669,099	
Bureau of Land Management	8,217,414	
Bureau of Indian Affairs	125,473	
National Parks	1,154,766	
Bureau of Sport Fisheries and Wildlife	497,379	
Other Federal	990,167	
State Land		5,231,724
Fish and Game Department	100,724	
Lands and Investment Department	5,131,000	
Private Land (includes Tribal)		60,385,027
STATE TOTAL		93,271,040

[1]From: "One-Third of the Nation's Land -- A Report to the President and to the Congress by the Public Land Law Review Commission." Washington, D. C., June, 1970.

D. Wildlife -- Upland Game Birds

Each wildlife species has evolved over a long period of time and is adapted to certain environmental conditions. No assessment of Montana's game birds can be made without understanding that they are products of and dependent on the quantity and quality of their habitat.

Nine species of upland game birds are hunted in Montana, including Merriam's turkey (*Meleagris gallopavo merriami*) and the three following groups:

Forest or Mountain Grouse

Blue grouse (*Dendragapus obscurus*)
Ruffed grouse (*Bonasa umbellus*)
Franklin's (spruce) grouse (*Canachites canadensis franklinii*)

Prairie-Upland Birds

Sharp-tailed grouse (*Pediocetes phasianellus*)
Sage grouse (*Centrocercus urophasianus*)
*Chukar partridge (*Alectoris graeca*)

Farmland-Upland Birds

*Ringnecked pheasant (*Phasianus colchicus*)
*Hungarian partridge (*Perdix perdix*)

---

*Introduced species.

Forest or mountain grouse inhabit and are hunted primarily upon public forests and adjacent private lands. Blue grouse are common in coniferous forests of western Montana and isolated mountain ranges of central Montana (Figure 7). They are usually associated with Douglas-fir throughout their range. Ruffed grouse inhabit dense, mixed conifer-deciduous forests of western and central Montana (Figure 8). Spruce grouse are found (Figure 9) in dense forest types such as alpine fir, Engelmann spruce or lodgepole pine. The extent and quality of forest grouse habitat depends upon the status of forest growth and effects of logging, grazing, and fires.

BLUE GROUSE DISTRIBUTION – 1970.

Fig. 7.

RUFFED GROUSE DISTRIBUTION – 1970.

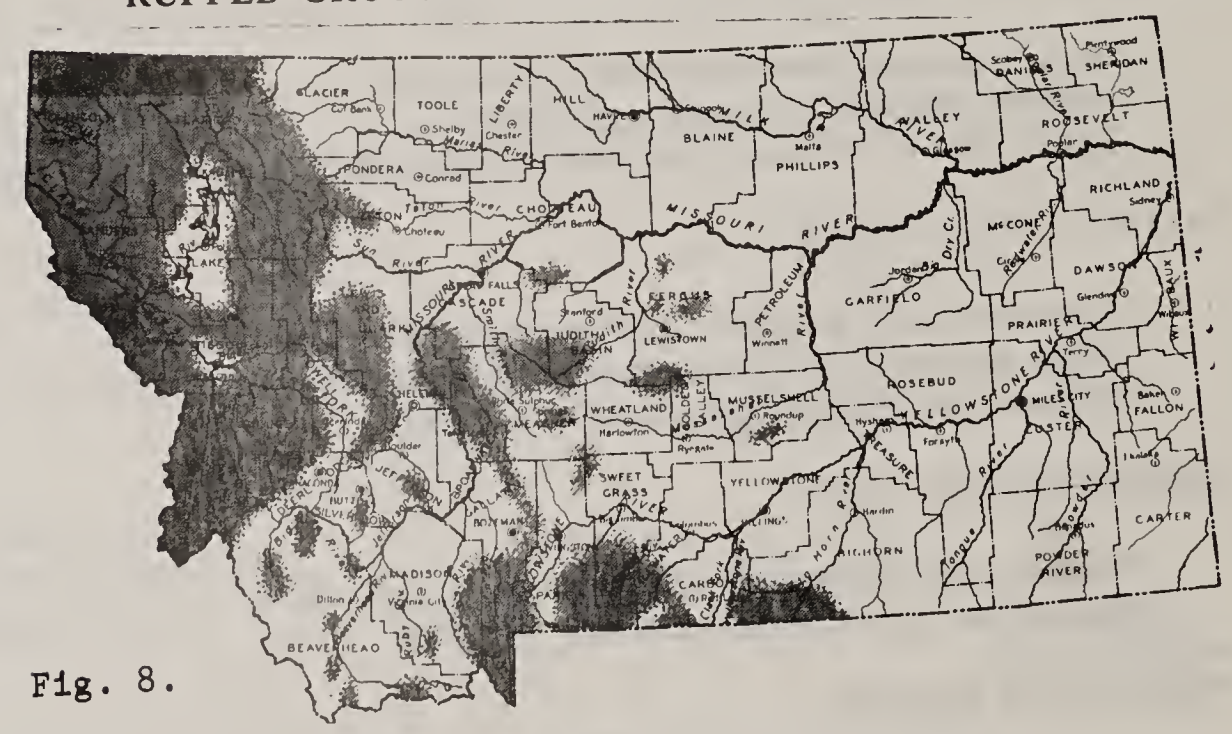


Fig. 8.

SPRUCE (FRANKLIN) GROUSE DISTRIBUTION – 1970.

Fig. 9

Prairie game birds inhabit and are hunted upon public and private lands. Two subspecies of sharp-tailed grouse have evolved in Montana. The Great Plains sharptail remains seasonally abundant in areas of eastern and central Montana (Figure 10) where mixed-prairie rangeland has been maintained in reasonably good condition. During high populations sharptails extend their range into marginal islands of native grasslands, usually along drainages which may be surrounded by cereal grain and fallowed fields.

The Columbian sharptail persists only in remnant stands of bunchgrasses and shrubs of the native prairie in the Blackfoot, Flathead and Kootenai River valleys, and is protected from hunting.

Sage grouse represent Montana's most specialized game bird; anatomical evolution of their digestive system has resulted in their dependence on sagebrush and associated herbaceous plants. Presently sage grouse are found in the sagebrush grasslands of 39 counties of eastern, central and southwestern Montana (Figure 11).

Chukar partridge, native to southern Europe and central Asia, introductions in Montana have been most successful (Figure 12) in the sagebrush-juniper or sagebrush-bitterbrush areas with an interspersion of cheatgrass and bunchgrasses.

The extent and quality of prairie game bird environments have been greatly influenced by cultivation and grazing. Expansion of strip-mining for coal in southeastern Montana may result in the most extensive impact on prairie grouse environments since Montana was first settled.

SHARPTAIL GROUSE DISTRIBUTION – 1970.

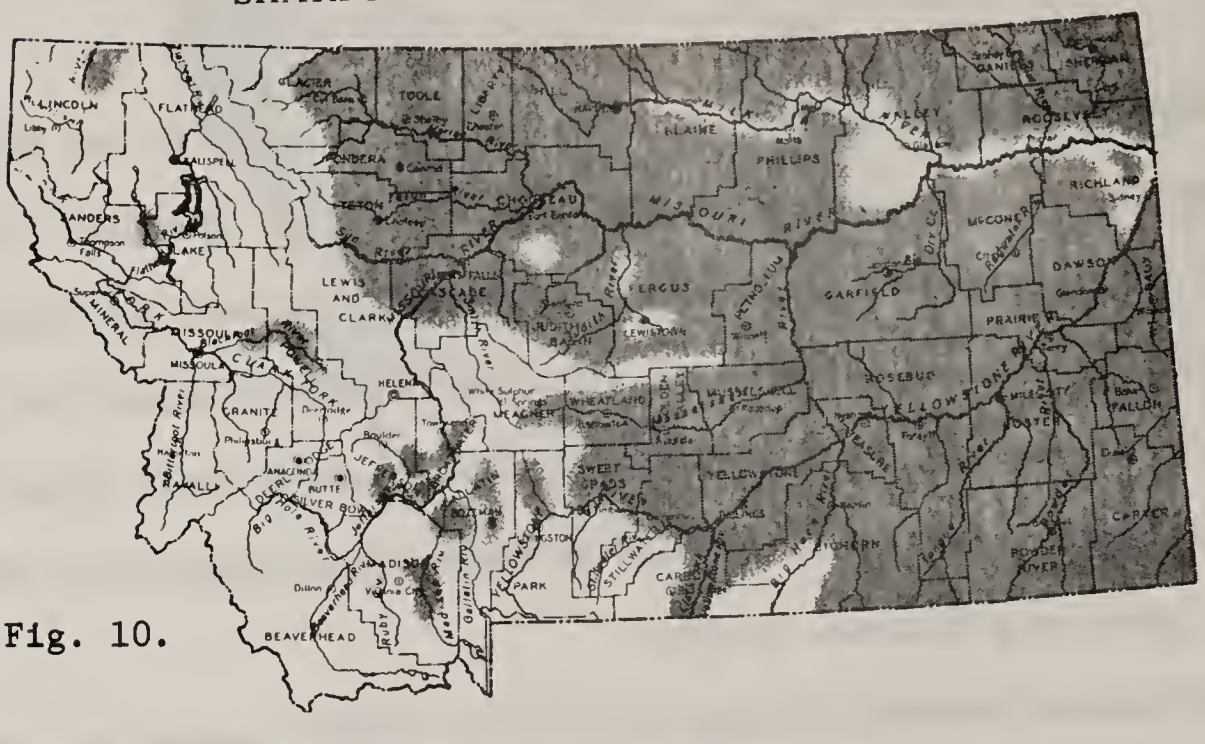


Fig. 10.

SAGE GROUSE DISTRIBUTION – 1970.

Fig. 11

CHUKAR PARTRIDGE DISTRIBUTION – 1970.

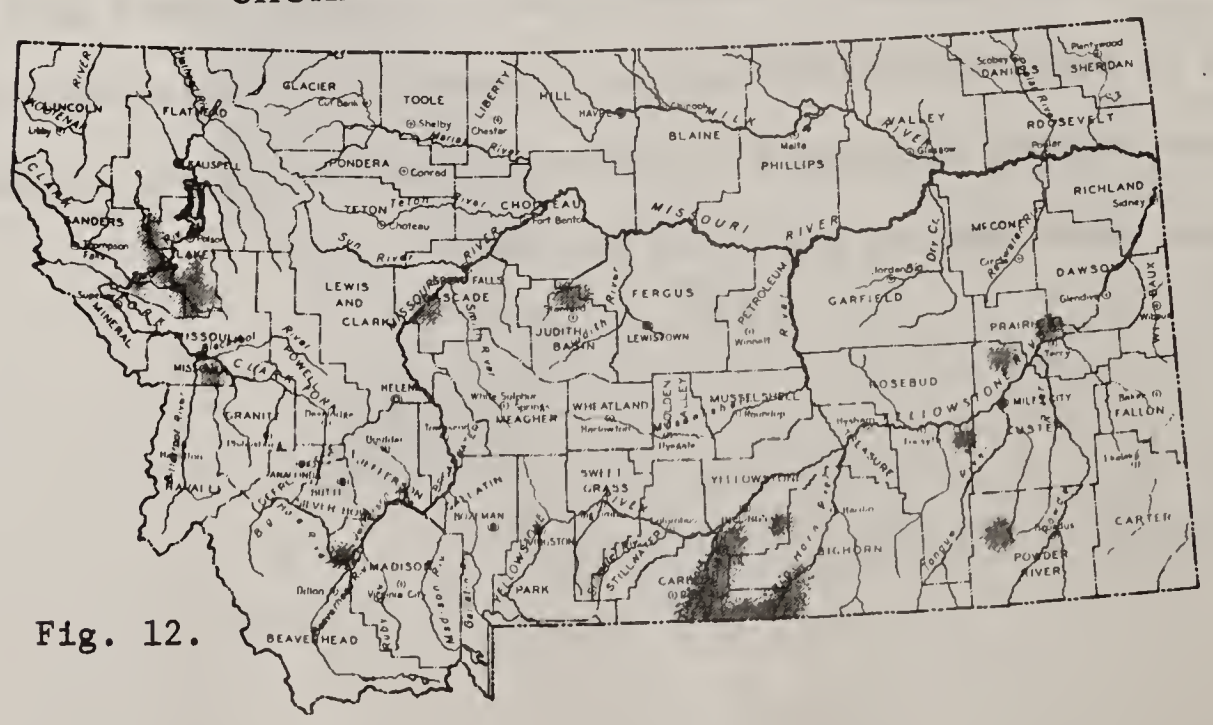


Fig. 12.

Farmland game birds inhabit and are hunted primarily on private lands; some State and Federal lands are also involved. The environmental niche formed by an expanding cultivated crop farming proved unsuitable to native Montana game birds. Pheasants and Hungarian partridge, which evolved in farmed areas of Europe and Asia, were subsequently and successfully introduced to fill this niche. Pheasants currently occur in 48 Montana counties (Figure 13) wherever the proper interspersion of grain crops, agriculturally-idle areas and adequate tree-shrub cover exist. Hungarian partridge environmental requirements incorporate those of pheasants plus some conditions required by native sharptails. Huns have been recently reported occurring in all but Lincoln County (Figure 14). Pheasant and Hun populations are almost entirely subject to influences of cultivated-crop and livestock industries. Urban expansion and highway construction are claiming increased acreages of once productive pheasant and Hun range. Strip mining for coal may also influence environments of these two species.

Several subspecies of turkeys are native to North America but none apparently inhabited Montana, either prehistorically, or historically. Introduction of Merriam's turkeys into 35 Montana counties (Figure 15) has met with varying degrees of success. Turkeys have been most successful in forests where about one-half the vegetative cover consists of ponderosa pine with remaining components of grasses, deciduous trees and shrubs in scattered small openings and stream courses throughout the forest.

Unsuccessful turkey transplants have occurred in ponderosa pine, lodgepole pine, Douglas-fir, deciduous woody and open, farmed areas. Major influences on turkey environments are provided by timber, livestock and mining interests.

RING-NECKED PHEASANT DISTRIBUTION – 1970.

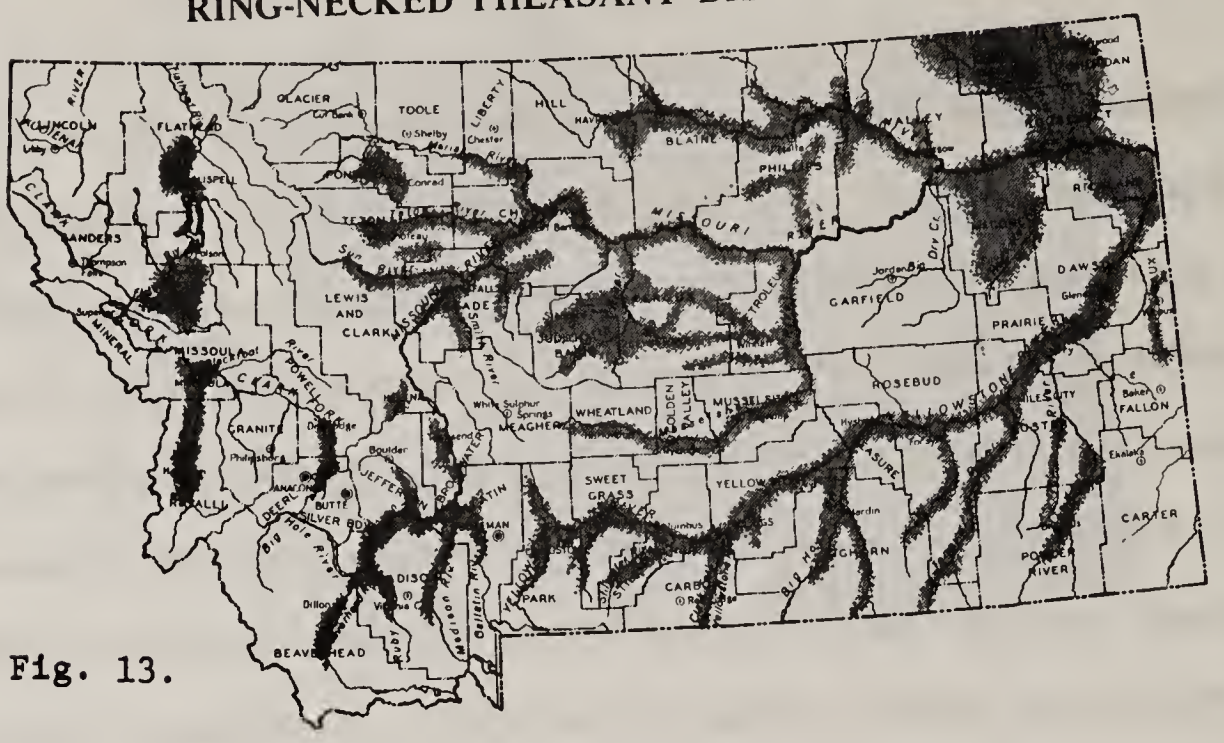


Fig. 13.

HUNGARIAN PARTRIDGE DISTRIBUTION – 1970.

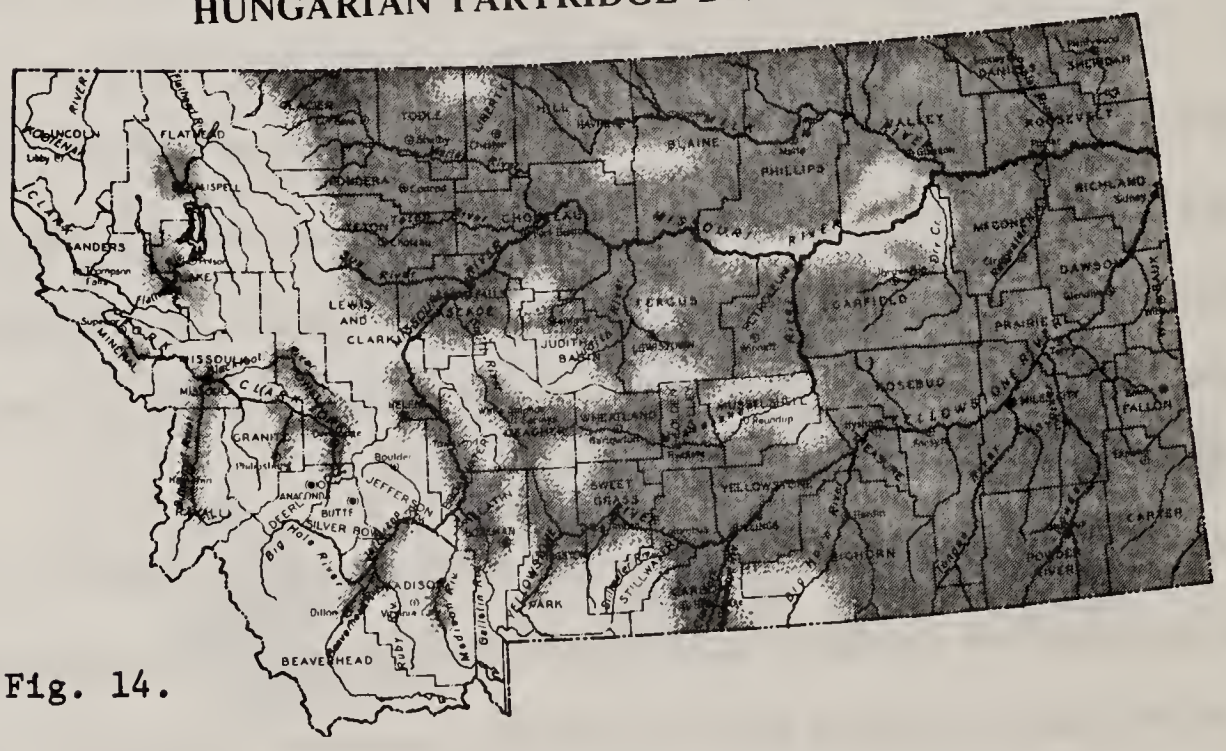


Fig. 14.

WILD TURKEY DISTRIBUTION – 1970.

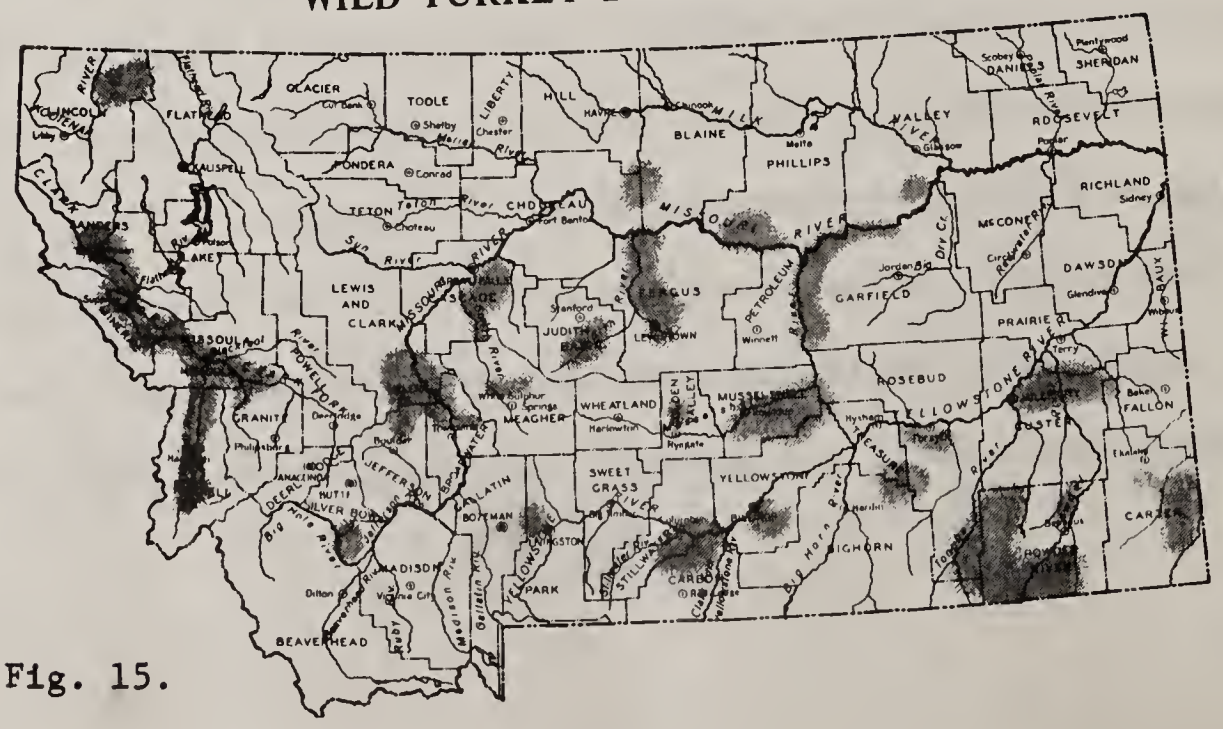


Fig. 15.

Further information and references regarding Montana game birds can be found in the Department's recent book, *Game Management in Montana*, (Mussehl and Howell 1971).

E. Vegetative Resources

It is not within the scope of this report to describe in detail the diversity of vegetation in Montana. A general description of the distribution of major vegetative types in presented. Seven broad types have been recognized (Figure 16). The forest type occupies one-fourth of Montana's area, most of which occurs in the west. Thirteen million acres of forest lie west of the Continental Divide and 9 million east (Montana Almanac 1959-1960). Western forests tend to occupy large blocks of land whereas in the east they occur as a series of island or patches. The unforested portion of the State is predominantly grassland or grassland-shrub mixtures. A classification consisting of five types (Morris 1959-60) is presented.

The northeastern Montana range is characterized by needle-and-thread grass and bluestem wheatgrass and is one of the best ranges in the State.

To the west and south is located the largest range area in the State. It contains the State's most common range type -- the mixed prairie range. This includes needle-and-thread grass, bluestem wheatgrass and grama grass. Grama and needle grass are more common on the coarser soils while wheatgrass is abundant in the coulees, valley bottoms, and on the more clayey uplands.

The grama grass type occurs in areas of approximately 12 inches of precipitation in central Montana. A large section of blue grama range is found between Cut Bank and Havre and north to the Canadian line. Extending from Miles City westward for many miles is another area of blue grama country. True buffalo grass is found mainly southeast of Miles City.

The bunch grass range begins in the foothills along the eastern edge of

KEY
Undifferentiated stream bottoms and intermountain valley, grassland and meadow
Forest and alpine grassland
Eastern Montana pine forest and savannah
Foothill grassland and sagebrush
Sagebrush and saltbush
Undifferentiated grassland
Prairie County grassland

SOURCE

Vegetative Rangeland Types in Montana, Montana Agricultural Experiment Station, Bozeman, Montana, 1949

Fig. 16

VEGETATIVE TYPES

the Rocky Mountains, and includes the mountain valleys of the Missouri and the Columbia drainage systems, and the dry open slopes and ridges in the forests. Bluebunch wheatgrass, needle-and-thread grass, and native blue grass are common on the drier and lower slopes. Idaho fescue and rough fescue are important on the better soils and at higher elevations.

Sagebrush range is found in all sections of Montana. Silver sage is abundant in valley bottoms of eastern Montana such as the lower Yellowstone. Big sage range occurs on heavy soils in the Little Missouri country and northwest of Miles City. A large sagebrush region is found in the area between a line running from Roundup to Winifred and the Musselshell River. The upper Missouri and the Smith River drainages are largely sagebrush range.

F. Climate

Montana's large area and great differences in elevation result in a highly diverse climate. While the lowest temperature recorded in the lower 48 states (minus 70 degrees F) occurred in Montana, temperatures in excess of 100 degrees F have been recorded many times at Montana stations. These extremes are unusual however. Actually, Montana's climate compares quite favorably with upper midwest areas because Montana's average weather, although slightly colder, is far less humid.

Within the State, weather varies greatly from region to region. The Continental Divide separates the State into two parts, each dominated by a different air mass. Eastern Montana weather is largely influenced by cool or cold dry air from northern Canada, and the western part of the State, by moist Pacific maritime air. The result is an average January temperature below 20 degrees F

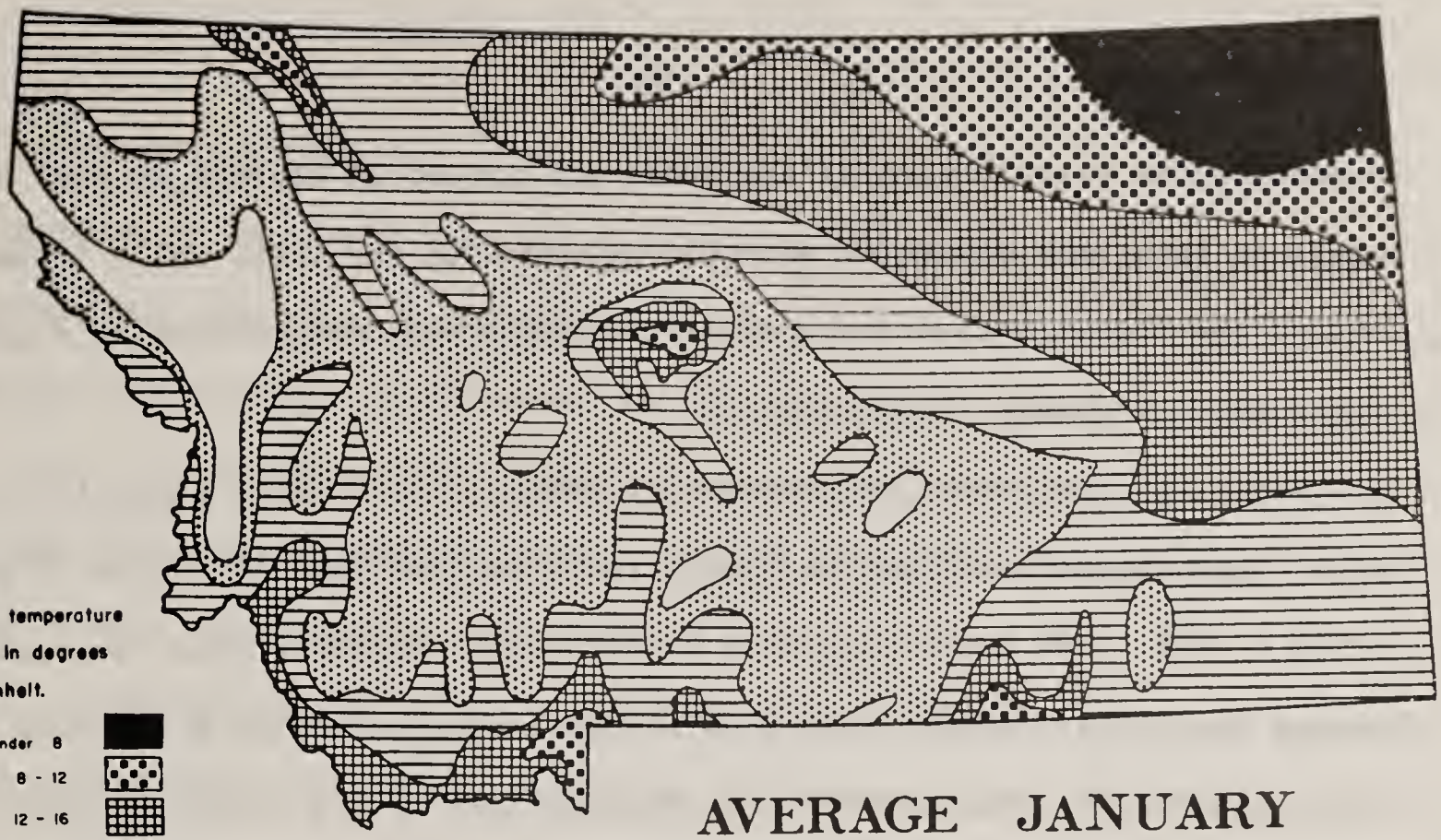

KEY
Average temperature shown in degrees Fahrenheit.
Under 8
8 - 12
12 - 16
16 - 20
20 - 24
24 - 28
SOURCE
USDA, Climate and Man
USDC, Bull. W and Supp. 11-20
AVERAGE JANUARY TEMPERATURE

Fig. 17

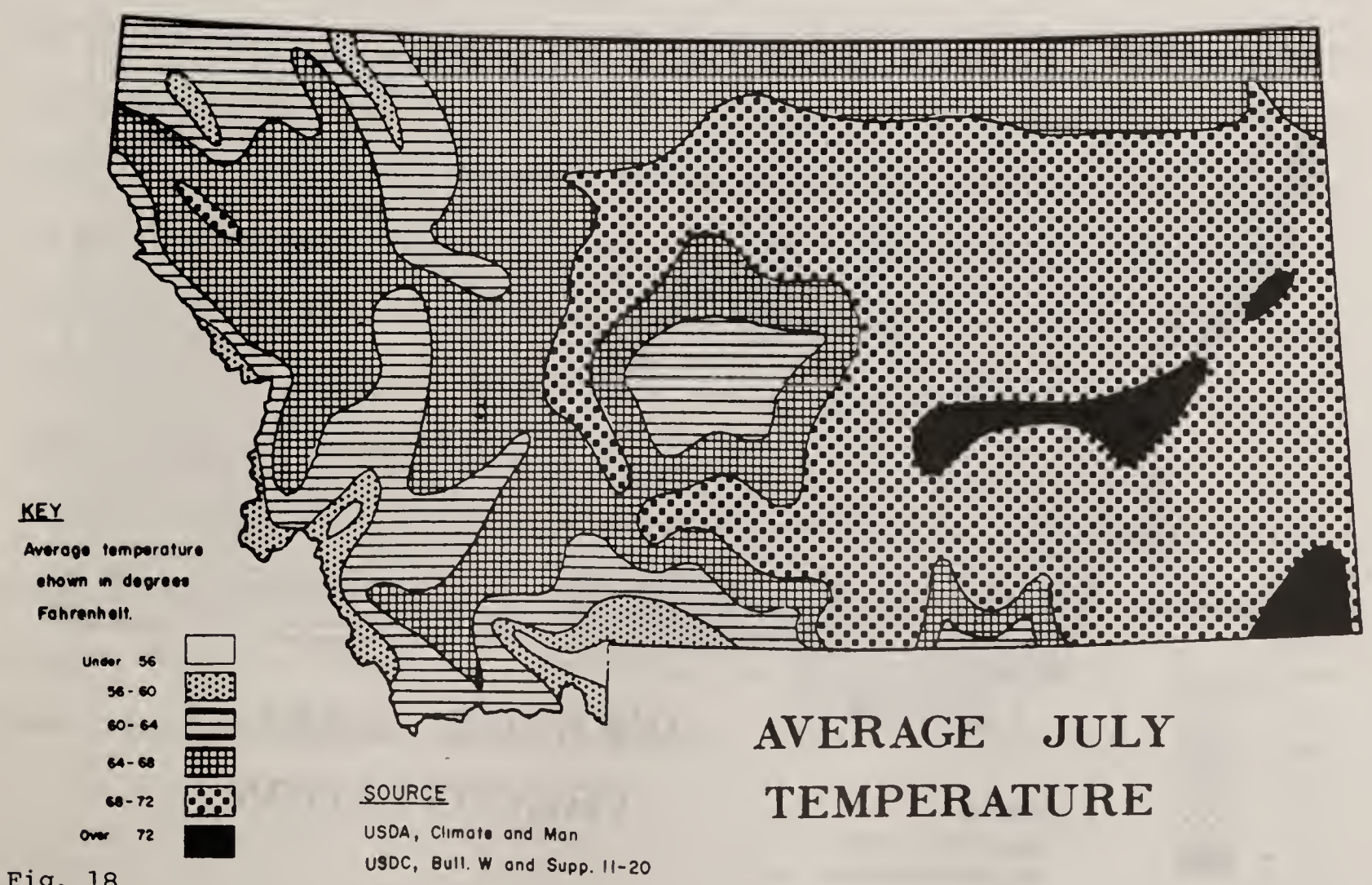

KEY
Average temperature shown in degrees Fahrenheit.
Under 56
56 - 60
60 - 64
64 - 68
68 - 72
Over 72
SOURCE
USDA, Climate and Man
USDC, Bull. W and Supp. 11-20
AVERAGE JULY TEMPERATURE

Fig. 18

in most of the eastern part of the State and around 20 degrees in most of the west. In July, the effect is somewhat reversed in the west, while in eastern Montana the more interior continental location keeps temperatures at a generally higher level (Figures 17 and 18).

Annual precipitation in Montana illustrates the State's generally dry climate. Approximately half of the State receives less than 15 inches of precipitation a year. The western portion receives more moisture than the eastern because Pacific air masses lose much moisture over mountainous portions of the State (Figure 19). Eastern Montana receives most of its annual precipitation from summer thunder shower activity, while a larger portion of the total precipitation in the west comes in the form of snow (Montana Economic Study Part I, 1970).

Except for a few areas of especially high elevation, Montana generally falls in the 30 to 60 inches of snow range.

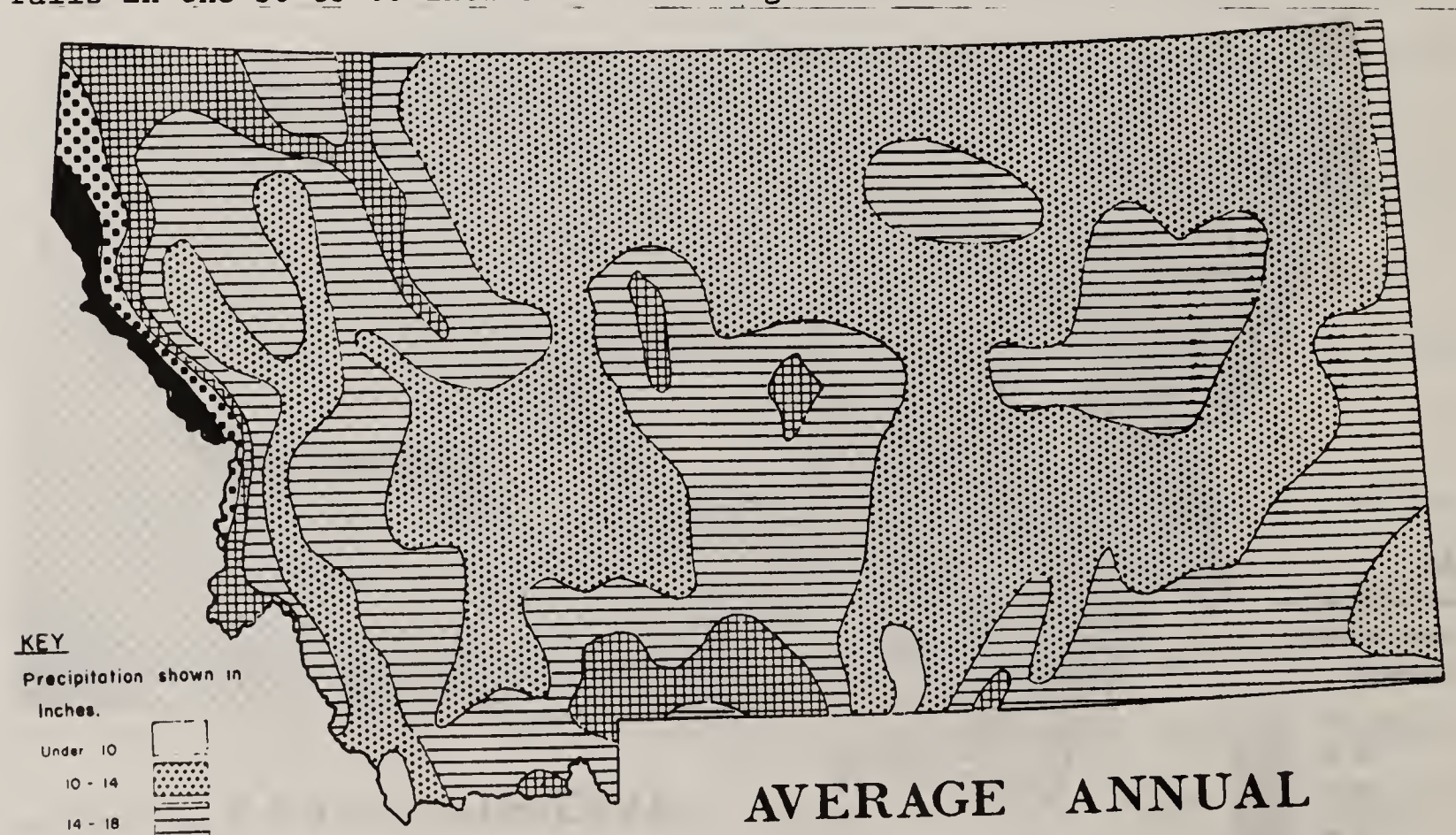


Fig. 19

G. Transportation Systems

Because of Montana's size and remoteness, transportation is a problem. Residents are economically penalized by transportation problems resulting from the State's geographic location and the small number of people in relation to land area. The inadequacy of public transportation, combined with the great distances involved explains the greater use of automobiles and private planes (Montana Economic Study Part II, 1970).

1. Highways, Roads and Streets. - Montana's highways, roads and streets are used by private automobile operators, and common contract and private truck and bus operators. Montana has approximately 112 miles of road for each 1,000 people.

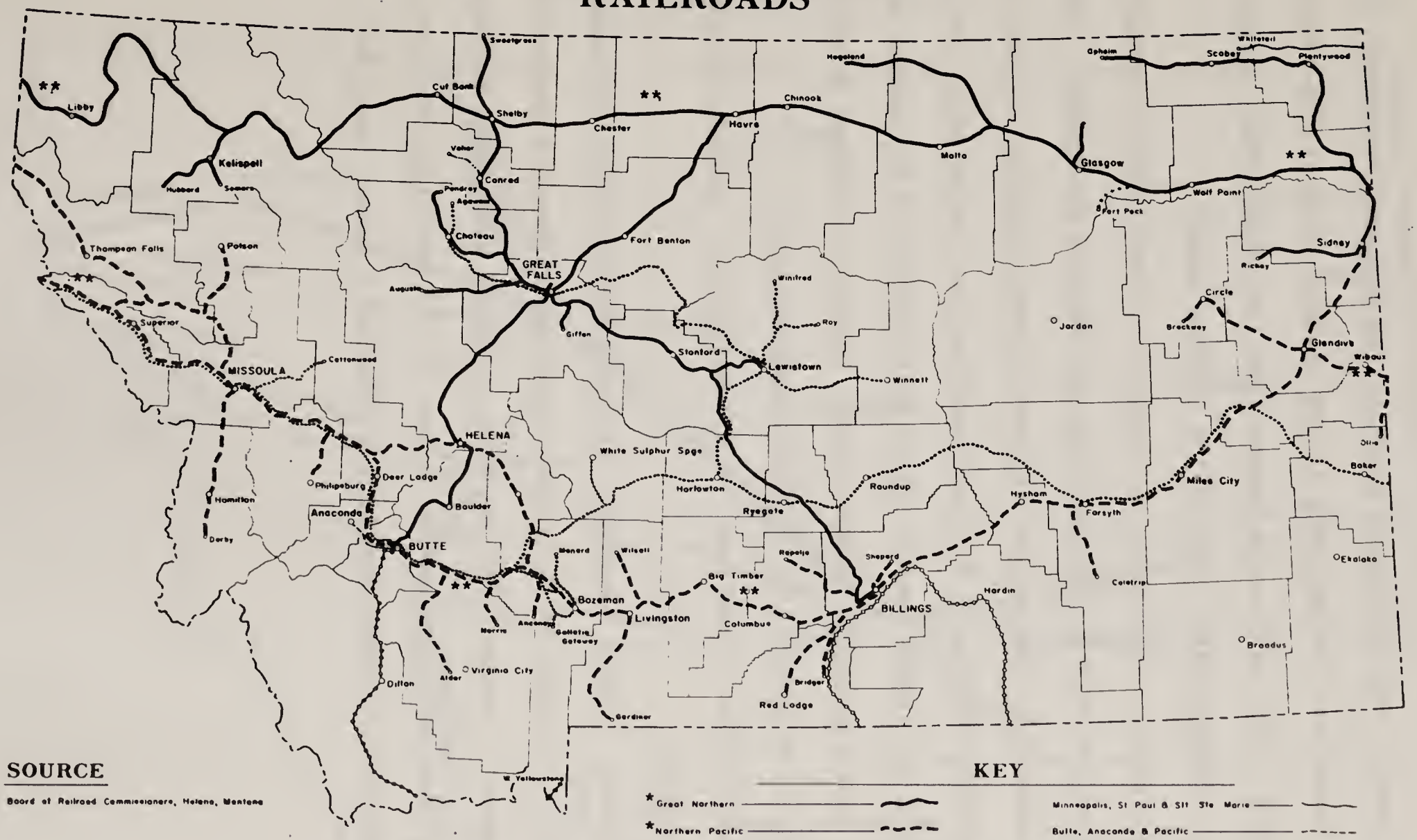
There are 77,919 miles of roads in total of which 75,540 (97 percent) are rural roads and highways, and 2,379 miles are city streets; 30,289 miles and 11,000 miles of the total roads are graveled and paved, respectively. The remainder are dirt roads. About 1,600 miles of city streets are paved and 750 miles gravel and/or dirt. The Interstate System (Figure 20) extends east to west from the Montana-North Dakota border to the Montana-Idaho State Line, and north to south from the Canadian border to the Montana-Idaho State Line. A branch extends from the east-west route at Billings to the Montana-Wyoming State Line (Figure 20) (Montana Highway Department, Division of Planning and Survey, personal communication).

2. Railroads. -- In March of 1970, three of the major railroads in Montana, Great Northern, Northern Pacific, and Burlington merged to form the Burlington Northern (Figure 21). Excluding the U. S. Government line at Fort Peck, six railroads now operate in Montana, three being locals with less than

LINCOLN
GLACIER
TOOLE
LIBERTY
HILL
PHILLIPS
VALLEY
DANIELS
SHERIDAN
ROOSEVELT
RICHLAND
FLATHEAD
PONDERA
BLAINE
TETON
CHOUTEAU
SANDERS
LAKE
McCONE
DAWSON
FERGUS
MINERAL
MISSOULA
LEWIS AND CLARK
CASCADE
PETROLEUM
GARFIELD
JUDITH BASIN
PRAIRIE
WIBAUX
POWELL
MEAGHER
WHEATLAND
GOLDEN VALLEY
MUSSELSHELL
ROSEBUD
GRANITE
BROADWATER
FALLON
RAVALLI
JEFFERSON
DEER LODGE
SILVER BOW
GALLATIN
SWEET GRASS
YELLOWSTONE
TREASURE
CUSTER
STILLWATER
POWDER RIVER
CARTER
PARK
BIG HORN
BEAVERHEAD
MADISON
CARBON
LEGEND
INTERSTATE NUMBERED HIGHWAY
U S NUMBERED HIGHWAY
STATE NUMBERED HIGHWAY
OTHER NUMBERED HIGHWAY
STATE OF
MONTANA
INTERSTATE, U S AND STATE
NUMBERED ROADS
HIGHWAYS

Figure 20.

RAILROADS



SOURCE

Board of Railroad Commissioners, Helena, Montana

KEY

- * Great Northern
- * Northern Pacific
- Chicago, Milwaukee, St Paul & Pacific
- * Chicago, Burlington & Quincy
- Union Pacific
- Minneapolis, St Paul & Ste Marie
- Butte, Anaconda & Pacific
- * Montana Western
- United States Government
- White Sulphur Springs & Yellowstone Park

* Merged in 1970 to form Burlington Northern

** Amtrak

Fig. 21

100 miles of road. The Burlington Northern and Chicago, Milwaukee, St. Paul and Pacific constitute the majority of the system. Each of the railroads is a freight outlet only, with major commodities including cereal grains, lumber and minerals. Tonnage-wise, coal is the leading export.

Passenger service is limited to "Amtrak," a "semi-public" corporation comprised of stocks held by the railroads and Federal government. Amtrak trains are operated by the various railroads under direction of the corporation. In Montana, Burlington Northern operates two trains daily (one each direction), and six trains weekly (three each direction) for Amtrak along the northern and southern routes, respectively, Figure 21 (Montana Economic Study Part II, 1970; J. Willard 1972, personal communication).

About 5,000 miles of railroad, or approximately 7 miles/1,000 people are in existence today.

3. *Airlines*. -- Four commercial airlines operate within Montana (Figure 22). Service is provided to 14 larger towns, and although somewhat limited, use has increased. Between 1950 and 1968, enplaned passengers increased from 13,076 to 44,371. Approximately 86 percent of all boardings occurred in Billings, Great Falls, Missoula and Butte (Montana Economic Study Part II, 1970).

AIRLINE ROUTES

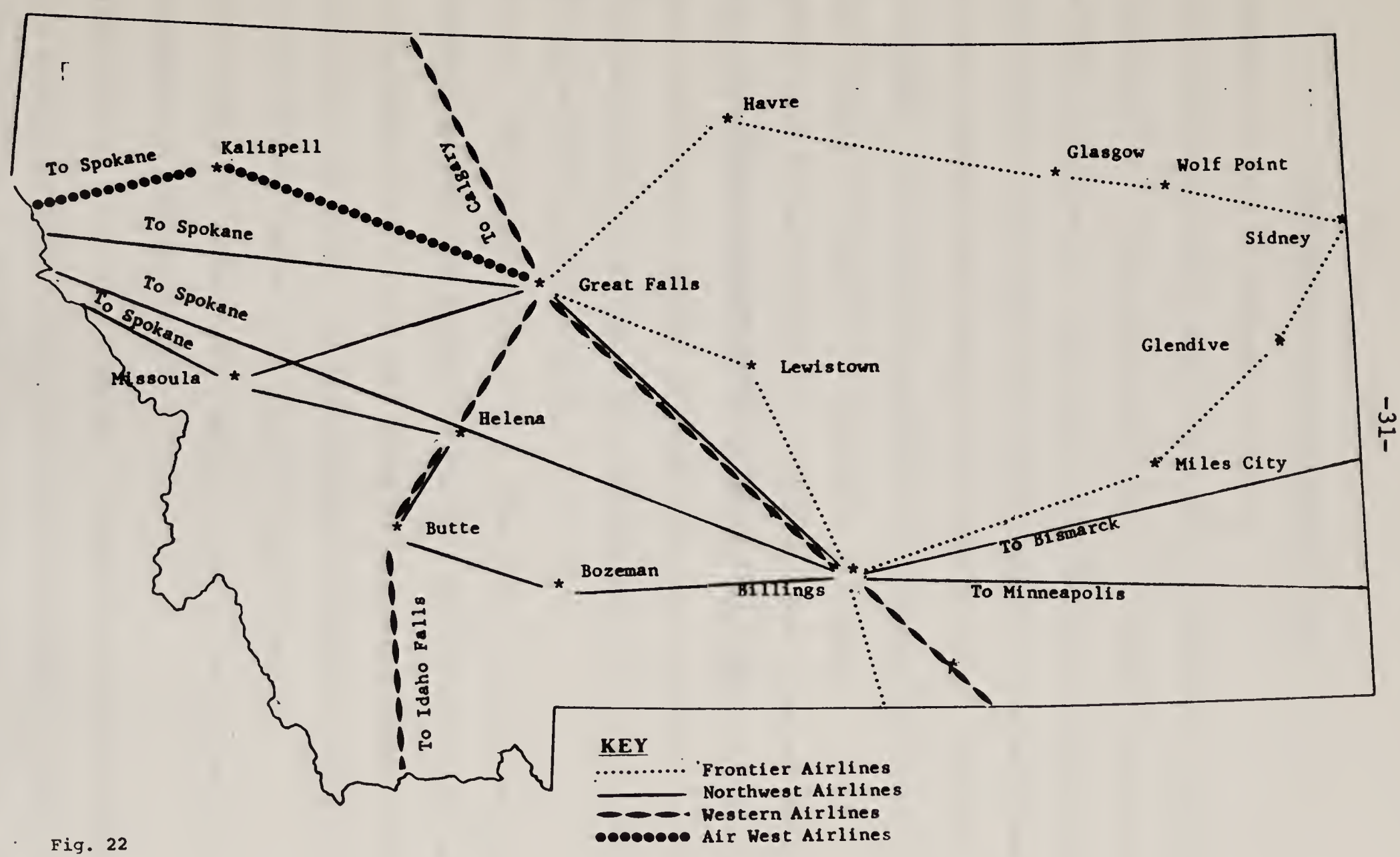


Fig. 22

IV. EVALUATION OF ENVIRONMENTAL IMPACT

EVALUATION OF ENVIRONMENTAL IMPACT

A. Environmental Impact of Proposed Action

1. Air.--Increased use of motor-vehicles by hunters will cause some degree of air pollution. Increased vehicle traffic from bird hunters will generally be widely distributed. Short-term concentrations of hunter-driven vehicles will occur in some localities though primarily on opening day of hunting. Temporary dust problems often develop during vehicle use on unsurfaced roads during dry weather. The actual significance of increased motor vehicle use by bird hunters to local or overall air quality is not known.

Campfires used by the occasional bird hunters that camp out could create minor degrees of smoke pollution at local sites. Accidental fires caused by hunters could create major degrees of smoke pollution depending upon the magnitude and circumstances of the fire. The possibility of accidental fires is discussed further under problems (IV-F).

2. Soil. -- The effects on soil will primarily be limited to minor damage to the terrain caused by bird hunters' vehicles. In certain cases, serious erosion of localized areas can be attributed to mechanical damage originating with the mis-use of vehicles. The significance of damage to the soil due to increased motor-vehicle use by bird hunters is not known.

Hunters' horses can cause minor damage to soil on trails and local areas where the animals are concentrated.

3. Vegetation. -- Mechanical damage to vegetation caused by vehicles is usually of a short-term nature except where the circumstances result in serious erosion and soil loss in local areas. Damage of vegetation by vehicles is

usually not extensive; however landowner sensitivity to any damage of certain crops can be understandably high.

Accidental fires could cause more extensive damage to vegetation and longer term changes in vegetation composition. The incidence of serious wildfires actually caused by bird hunters is not known to be high. Fire is discussed further under Problems in Section IV-F.

4. Water. -- Possible effects on water would be limited to human activities such as careless disposal of refuse and vehicles crossing streams and causing local siltation. Any repetitive problems developing in local areas could probably be curtailed through law enforcement and/or educational programs.

5. Visual Appearances. -- Effects on the visual appearances of the landscape could be caused by the short-term presence of hunters and their vehicles, camping equipment, dogs and horses. Longer visual effects could be caused by violations of litter laws, destruction of soil or vegetation by vehicles, or by the results of accidental fires. Repetitive problems developing in local areas could probably be curtailed through law enforcement and/or educational programs.

6. Sounds and Smells. -- The primary sounds associated with hunting activity are the occasional discharge of firearms and vehicle noises. Lesser sounds would result from human voices and barking dogs.

Smells resulting from hunting activity would include sources such as improperly disposed garbage and offal of game birds. Such smells generally would be of a very local nature and of short duration. Repetitive occurrences could be curtailed through law enforcement and educational programs.

7. Human Health. -- Both benefits and possible adverse effects to human health can be expected during human involvement in outdoor activities such as big game hunting.

Hunting is a recreational activity that can provide both valuable physical exercise and mental relaxation to the participants and in general be beneficial. Combined with other outdoor sports it may help provide the only major physical exercise and mental relaxation for people in the more sedentary occupations.

Any use of firearms involves a certain degree of risk, both to the user and to those within firearm range.

Records of hunting accidents in Montana since 1959 showed 506 persons have been involved in sporting firearm accidents (Table 4). The fatality rate, 1959-1971 is 3.2 per 100,000 resident hunting licenses sold. In 1968, Montana's fatality rate was 1.3 per 100,000 license holders compared to 2 per 100,000 license holders nationwide (410 fatalities, 20.9 million licenses sold). Fatalities occurred in 21 percent of Montana's 1959-1971 accidents.

In a continuing and apparently successful attempt to reduce hunting-firearm accidents, the Montana Fish and Game Department and over 800 volunteer instructors have graduated 107,104 students in the Hunter Safety Program. As of December 31, 1971, Hunter Safety graduates represented 15.6 percent of Montana's total population. These efforts have been recognized by the International Association of Game, Fish and Conservation Commission's Award of Merit in 10 of the 11 years program records were submitted. In 1967, Montana received the Grand Award from this Commission for its outstanding program among all states and Canadian provinces sponsoring Hunter Safety Programs.

TABLE 4. MONTANA HUNTING AND NON-HUNTING ACCIDENTS INVOLVING SPORTING FIREARMS, 1959-1971.

	HUNTING CASUALTIES				NON-HUNTING CASUALTIES			
Year	Fatal	Non-Fatal	Total	% Fatal of Total	Fatal	Non-Fatal	Total	% Fatal of Total
1959[1]	11	29	40	43	10	42	52	19
1960	6	27	33	18	15	44	59	25
1961	9	26	35	26	1	7	8	13
1962	9	33	42	21	2	3	5	40
1963	5	20	25	20	1	5	6	17
1964	5	13	18	28	1	9	10	10
1965	8	19	27	30	0	11	11	0
1966-67[2]	4	26	30	13	1	5	6	17
1967-68	6	9	15	40	1	15	16	6
1968-69	3	9	12	25	U N A V A I L A B L E			
1969-70	6	26	32	19	1	9	10	10
1970-71	1	13	14	7	U N A V A I L A B L E			
TOTAL	73	250	325	23	33	150	183	18

Year	Total Casualties: Fatal	Non-Fatal	Total	Total Resident and Special Hunting Licenses Sold	Fatalities: 100,000 Licenses
1959[1]	21	71	92	307,225	6.8
1960	21	71	92	310,336	6.8
1961	10	33	43	310,965	3.2
1962	11	36	47	315,780	3.5
1963	6	25	31	323,625	1.9
1964	6	22	28	302,447	2.0
1965	8	30	38	292,599	2.7
1966-67[2]	5	31	36	294,972	1.6
1967-68	7	24	31	300,755	2.3
1968-69	3	9	12[3]	229,695	1.3
1969-70	7	35	42	245,211	2.8
1970-71	1	13	14[3]	U N A V A I L A B L E	
TOTAL	106	400	506	3,233,610	3.2

[1]January 1-December 31 of each year, 1959-1965.
[2]May 1-April 30 of each year, 1966-1971.
[3]Incomplete Data.

Certain afflictions to human health, including heart attacks, frostbite, death from exposure, and other accidents may be suffered by hunters. While statistics are lacking for these human health problems, many are avoidable if the hunter embraces necessary precautionary measures. In the absence of hunting, a compensatory degree of similar effects could be expected in other outdoor recreations substituted for hunting.

There are possibilities of disease transmissions from game birds to humans. We have no records of actual cases of human sickness from harvested game birds.

8. Wildlife. -- Montana's upland game bird management program is based on the knowledge that game bird populations annually experience a relatively high natural mortality and that a portion of the natural mortality can be replaced by hunting harvests. The high natural death rate of birds is compensated by a high reproductive rate. Populations tend to increase beyond the capacity of their year-around habitat. Each breeding season produces a high percentage of birds which will not live until the next breeding season. As stated by Allen (1954:43), " ... Nature habitually maintains a wide margin of overproduction. She kills off a huge surplus of animals whether we take our harvest or not." When hunting is allowed, many of these surplus birds can be taken by hunters instead of dying from other causes. Thus, the annual *harvest* by sport hunting is aimed to utilize or "crop" a portion of the fall population while maintaining adequate breeding stock.

Hickey (1955:430) stated that galliform species may have annual mortality rates in the range of 60 to 90 percent. Studies of pheasants (Leopold *et al.* 1943; Buss 1946; and Mallette and Harper 1964) and Hungarian partridge (Jenkins 1961) show mortality rates within the 60 to 90 percentage range. Subsequent studies show that some of the native grouse have somewhat lower annual mortality rates than the introduced pheasants and Huns. Adult blue grouse (males) have an annual mortality of about 30 percent (Mussehl and Schladweiler 1969; and Bendell and Elliott 1967). Intensive long-term banding studies by Gullion and Marshall (1968) show that about 45 percent of young male grouse *survive* each winter over a 5-year period.

The relatively high ratio of young birds in the fall harvest also gives

an indication of the age composition within a grouse population. Sharptail and sage grouse harvests in Montana have included 62-72 percent and 53-68 percent juveniles, respectively (Weigand 1972).

Banding studies of wild turkeys in Montana have indicated annual mortality in excess of 50 percent, whether they were hunted or not (Jonas 1966).

Various studies have been conducted to determine the relationship of annual hunting harvests to game bird populations. In Montana only 75 (6.6 percent) of over 1,100 blue grouse banded from 1957 to 1967 were reported shot by hunters (Mussehl *et al.* 1969). Even if only half of the banded birds shot were reported -- this does not indicate that existing hunting pressure was taking excessive numbers of this popular species which is exposed to a long hunting season. A similar blue grouse study in British Columbia by Bendell and Elliot (1967) reported that 20 to 30 percent of autumn populations might be taken without effecting spring populations. Sharptail banding studies in Montana (Brown 1971) show that hunters harvested from 5 to 30 percent of fall populations. Though excessive kills can occur on local areas, this rate of harvest is not considered depressive to overall sharptail populations.

Numerous studies from other states indicate that game bird populations can sustain annual harvests (and under heavier hunting pressure than most Montana situations). For instance, with Michigan ruffed grouse Palmer (1956) concluded: "During a 6-year period representing a cyclic phase from a high population to a low, studies on a heavily hunted area and on an unhunted area showed that removing an average of 40 percent of the population by hunting had no apparent detrimental effect on the subsequent fall population. Since the relatively small

hunted area received about four times as much hunting pressure as the state average and was not over-harvested even during a 41-day season we conclude that Michigan could probably have a 2 or 3-month, or possibly even longer grouse hunting season."

Hickey (1955:373) states that, "Hunting is essentially a type of predation that affects a prey species according to its density. At the present time, it does not appear to exert a generally depressive effect on most galliform populations in America."

Dasmann (1964:164) concluded, " ... it is not worthwhile to attempt close control over single decimating factors in an effort to increase upland game birds. In a complex environment the point at which a population will stabilize, at the low of each annual cycle, is that point at which the habitat offers security against further loss."

In 1933, Leopold (1933:211) proposed, and later Allen (1954:124) documented, a law of diminishing returns as it pertains to hunting. Briefly stated, hunting efforts rewarded by harvesting birds generates interest toward additional hunting effort. Unrewarded hunting efforts will probably result in the hunter seeking "greener game pastures" or he may cease hunting for the season. Therefore, hunting is, to a large degree, self-regulatory. Hunters normally reach the point of diminishing returns long before the local game bird population is seriously decimated.

For instance, Braun and Rogers (1971) found in one area that once one-third of a ptarmigan population was harvested, that hunters had little success in finding more ptarmigan. They concluded that the allowable harvest should not be more than 35 to 40 percent of the fall population.

Beginning in the early 1960's, Montana's upland game bird hunting seasons were generally liberalized (longer seasons, larger bag limits) from the very restrictive seasons allowed during the several previous decades. Ten years of liberalized hunting seasons have resulted in generally increased harvests (with yearly variations) of upland game birds with greatly increased recreational opportunities for the public (Mussehl and Howell 1971).

Montana bird hunters enjoy a variety of some of the finest quality bird hunting in the Nation, with relatively low hunter densities. Major changes in the State's economy, such as vast expansions of coal-stripping operations with influxes of people, could result in increased hunting pressure for available game birds on existing or lesser acreages. Hunting seasons are set annually on the basis of existing conditions and can be modified to adapt to any now unforeseen circumstances that would jeopardize the perpetuation of huntable numbers of any game bird species.

B. Adverse Environmental Effects Which Cannot Be Avoided

1. Air. -- Vehicle-caused dust and motor emissions could locally cause noticeable short-term effects on air quality. These effects are not considered to be of major importance with present levels of hunter participation. In the absence of hunting many of the same participants would probably be in the field pursuing some other outdoor recreation. Hunter campfires add noticeably to the amount of foreign material in the air locally. However, most Montana bird hunters do not camp out or do not use open fires and air pollution from this source is probably minimal. Prohibiting all types of open burning would solve this problem with few if any complaints.

2-3. Soil and Vegetation. -- Some adverse effects to soil and vegetation can be expected due to damage by hunters' livestock and vehicles. This damage is usually of short-term duration, localized, and could probably be minimized or avoided in critical areas by enforcement and hunter education efforts.

4. Water -- No extensive adverse effects to water are expected during the relatively short-term presence of bird hunters in the field. Litter dumped into water by irresponsible hunters detrimentally effects both aesthetics and water quality. Littering, washing of field-dressed birds in lakes or streams, unsanitary camps near water, etc., could also cause short-term degredation of water quality. Here again hunter education programs hold the most promise for eliminating this problem. Where roads and trails repeatedly cross streams some sedimentation would be expected. Bridge construction and/or realignment of roads and trails could alleviate this problem in some cases.

5. Visual Appearances. -- Minimal visual effects are expected due to the short-term presence of bird hunters in the field. Accidental fires could cause

adverse effects in local areas; high risk of wildfire actually due to bird hunters afield has not been demonstrated (See IV-F). Wounded birds are a distasteful sight to everyone; most hunters make an honest effort to quickly dispatch cripples and add them to their bag. Litter around camps, along trails, etc., is visually displeasing to nearly everyone. Adequate enforcement of existing litter laws could substantially reduce litter problems.

6. Sounds and Smells. -- The overall sounds and smells of hunters' vehicles, firearms and general activity including camping, cannot be avoided, but are not considered a major adverse problem. Local problems can usually be eliminated by special regulations and enforcement efforts.

7. Human Health. -- Gun accidents, death due to over-exertion, and other accidents are an adverse effect that is to some degree inherent to this type of outdoor recreation. Education efforts such as the Hunter Safety Program are showing success in reducing the gun accident rate. The other health-related problems of certain people might be transposed to other outdoor pursuits substituted for hunting.

There are remote possibilities of disease transmissions from game birds. We have no records of human illness derived from harvested birds; though there is one record of tularemia in Montana sage grouse in 1931 (Parker, Phillip and Davis 1932). Most hunters would probably discard carcasses of any birds they thought were sick or diseased, possibly without even trying to confirm these suspicions. Careful scrutiny of behavior of harvested birds, visceral organs, etc., while cleaning, and proper handling and cooking would probably eliminate most human health problems associated with diseased birds.

8. Wildlife. -- Wounded game has been previously mentioned. Another possible adverse effect would be the killing of protected bird species through incorrect identification (mistaking juvenile and/or hen pheasants for sharp-tails), prejudice or ignorance (deliberate shooting of hawks and owls, etc.). Here again educational programs hold considerable promise for alleviating this problem.

Current knowledge indicates that the annual harvests of upland game birds are being sustained without jeopardy to future populations. Hunting seasons are set annually on current conditions; if circumstances arise that indicate that harvest levels may exceed biological limits of a species, appropriate modifications in hunting seasons and regulations can be implemented. It is not anticipated that the currently proposed seasons will have an adverse effect on future wildlife populations.

C. Alternatives

Basically the only alternative to the harvest of upland game birds by sport hunting is *no sport hunting*. In the absence of sport hunting, however, existing and/or additional environmental problems will still be encountered. Bird hunter interests will probably be diverted to other recreational pursuits with their attendant environmental complications. In the total absence of hunting, certain other forms of recreation could only partially replace the demand for hunting. Private shooting preserves, trap and skeet shooting, wildlife photography, falconry and other outdoor pursuits, might increase in popularity.

We cannot agree that the prohibition of hunting is necessary or desirable to maintain game bird populations. Thousands of days of recreational outdoor sport would be lost annually by this action. Judging by the proportion of Montanans who hunt, continuance of this traditional sport is apparently viewed favorably. Private landowners objecting to hunting for various reasons can and do prohibit hunting on their land. Biological information from many sources including Hickey (1955:373) indicates that hunting generally does not have a depressive effect on most American game bird populations. Montana game bird studies, and the history of sustained harvests indicates that hunting has not influenced overall game bird populations from year to year.

An important facet of *no hunting* would be the loss of money (hunting licenses and Federal Excise Tax on guns and shells) expended for:

a. Research into ecological requirements of individual game bird species;

b. Effects of various land uses and land management practices on bird habitats and populations;

c. Continual monitoring of bird population levels and habitat conditions;

d. Acquisition and maintenance or development of environments requisite to perpetuation of the individual game bird species.

These funds are currently provided by resident and nonresident hunters. Substitute funding of several hundred thousand dollars annually through general taxation measures is a possibility; but could encounter serious opposition by Montana taxpayers generally as well as by political forces.

Hunting, although apparently not a factor in controlling year-to-year populations, might reduce crop damage from abnormally high game bird populations in local areas by removing some birds and dispersing the remainder.

Alternatives to hunting for reducing occasional game bird damage complaints have additional drawbacks as discussed below.

Trapping and Transplanting. -- This alternative is considered justifiable only in unusual cases.

Trapping and transplanting to alleviate damage complaints is a costly and never-ending chore once it is started. It may accomplish its intended purpose, or it may simply transfer the problem to a different locality. Production during the succeeding summer will replenish depleted bird numbers and the problem could recur repeatedly.

Poisons and Other Deleterious Substances. -- Several pesticides and other available poisons are known for their effectiveness in killing birds and could be used to reduce specific upland game bird populations. Because of the inherent dangers associated with the use of any poison, growing public distaste for such practices, and the availability of several superior alternatives, this method cannot be seriously considered.

Reproductive-deterrent chemicals could also be used to temporarily reduce troublesome bird populations. It would probably be impossible to obtain desired results on large areas since the only presently feasible method of introducing these substances would be through the food. To get proper distribution would take large amounts of manpower and funds which would have to come from the general public in the absence of licensed hunting. Also, some game bird species (notably the forest grouse) have food habits which would preclude wide-scale acceptance of any readily available bait even if it could be correctly distributed. This alternative also has only very limited application.

Introducing Predators. -- The possibility of transplanting or producing and releasing various upland game bird predators into bird environments is too remote, ecologically, financially or in public acceptability, to consider practical for control of bird populations.

D. Short-Term, Long-Term Use

The short-term effects on the environment of conducting annual game bird harvests have been discussed (IV-A). No long-term effects on game bird populations are anticipated if harvest levels are held within the biological limits of the various species. The degree of harvest can be and is regulated by the type of season set each year.

Continuation of the Pittman-Robertson funding program (hunting licenses-excise tax on sporting arms and ammunition) for game bird research, surveys, and habitat acquisition is expected to provide maintenance and long-term improvements to wildlife qualities of the environment.

E. Irreversible and Irretrievable Commitment of Resources

Game bird populations are renewable resources whose future depends upon the quality and quantity of habitat available to each species. Current knowledge does not indicate that present levels of harvesting game birds will cause any irreversible or irretrievable commitment of resources.

F. Discussion of Problems and Objections by Other Agencies or the Public

The general public has various misunderstandings about the relationships of hunting to game bird ecology and population dynamics. Problems of public understanding of wildlife management principles are reviewed by Allen (1954:

293-308). While considerable progress has been made by the public in understanding resource management, mis-information and lack of understanding of ecological facts still persist. Until the current national wave of environmental concern, the biologists' problems centered on translating existing scientific information into language the public, and even some other agency personnel, could understand and accept. The volume of information available was usually adequate. Organized sportsmen, particularly the Montana Wildlife Federation, have been actively promoting acceptance for annual, scientifically-regulated game harvests and for a biologically-sound game management program in Montana.

Some of the problems that will be discussed below have previously been dealt with under Section A.

Private Property Owners

1. Season Structure. -- A variety of complaints are made by landowners relating to the structure of the season, the length of season, the dates it opens and closes. Some prefer having no hunting season at all. Reasons vary from an aversion to hunting or hunters, feelings to protect the game, or personal or business reasons. Some would like a special season to deal with a local situation. Landowners commonly request control of big game populations on their lands but do not want any kind of hunting seasons. Others would like to see special closures to the public at large enforced by the Fish and Game Department but open to them or guests. Hunting seasons cannot practically be adjusted to accommodate each individual landowner and accomplish the resource management objectives of a season. They must consider broad land forms and

problem areas to prevent total confusion to the hunting public. Current game bird seasons are designed with the total management objectives and specific problems in mind. The variation in viewpoint in local areas prevents formulation of a season acceptable to all people even if management objectives were diluted.

2. *Disturbance or Nuisance.* -- The disturbance type problems have no long-lasting consequences and relate primarily to inconsideration on the part of individual hunters. Problems include hunters waking the landowner at odd hours to obtain permission to hunt, harassing of domestic livestock, disrespectful conduct on the part of hunters, hunting without permission and the general nuisance that can be associated with hunter activity. These problems can be lessened by educational efforts by interested sportsmen's groups and the Fish and Game Department. Descriptive signing of property by landowners can also do much to alleviate annoyance both to the landowner and the hunter.

Other solutions may be found through an incentive such as the Cropland Adjustment Program, initiated in 1966 in certain states, which provided Federal payments to landowners for permitting hunting on enrolled acreages.

3. *Environment Disturbance.* -- Landowners are concerned with littering of the landscape by the hunter, the possibility of starting fires and disturbance to soil and vegetation by careless use of vehicles and horses. These problems have been discussed in detail under evaluation of environmental impacts.

4. *Property Damage.* -- Livestock can be wounded or killed by the careless

bird hunter. The incidence of this happening is of a small magnitude. Detailed investigations of such losses have demonstrated that not all reported losses were hunter caused, and some were exaggerated in the reporting. Destruction of property, such as shooting of mail boxes, signs and buildings does occur. True acts of vandalism cannot necessarily be associated with hunting. Precise data relating to the magnitude of accidental damage is not available. Careless hunters do leave gates open and allow mixing or movement of livestock, requiring effort and expense by owners to gather them. Such occurrences usually lead to additional posting of land.

Most of these problems could be better corrected by combining laws relating to public use of private land under a single statute with greatly simplified provisions. Efforts by property owners to file complaints would serve to discourage such activities by others. Hunters must also realize that their responsible actions in apprehending violators would further their own cause and that of the landowner. The same principles apply on public lands.

Recreational Hunter

The recreational hunter has a variety of views as to a desirable season. The majority are interested in as much hunting opportunity as possible, though primarily in their own favorite aspect.

Recreational hunters have displayed strong interest in obtaining access across private holdings to public lands. Lack of access to public lands, both State and Federal, has compounded hunter congestion problems on private holdings within some areas of the State.

Big game hunters, guides and outfitters occasionally complain about upland

game bird hunters disturbing big game animals prior to big game hunting seasons. There is little evidence supporting or refuting these claims; any actual cases probably occur in very limited local areas rather than statewide.

A certain amount of accidental shooting of game birds through misidentification occurs every year. Mistaking late-hatching pheasants for sharp-tailed grouse or Hungarian partridge in mid-September has occurred with experienced as well as novice hunters.

The best solution to hunter problems is intensive educational programs concerning upland game bird biology and ecology, hunting ethics, and identification of various bird species accompanied by effective law enforcement in prosecuting intentional violators.

Anti-Hunter

While a certain number of people have always been opposed to hunting for various reasons, only recently has this movement gained the momentum which may endanger the existence of the very animals they hope to save. For instance, certain "Kool-Aid" packages (General Foods, Inc.) include the slogan "Stop Hunting" with no further explanation of why or where or other consequences. The recent addition of the movie and television media to the anti-hunting group should be viewed with alarm since fiction, fakery and falsehood about game management, ecology and sport hunting have been incorporated for large-scale public viewing (East 1972a and 1972b). Anti-hunters are not content to allow others their own beliefs, but scorn hunters as psychotic murderers and worse. What they fail to recognize, or at least admit, is that their own survival depends on taking life in one form or another. Ironically, the programs supported by

the hunters' activities often supply the essential source of funds supporting maintenance of wild populations of both hunted and unhunted species.

Land Management Agencies

Many of the problems encountered by private landowners also pertain to public land managers, including the Fish and Game Department. These problems are adequately discussed under the preceding sections.

Wildlfire

Concern by landowners for accidental fires has to be appreciated, particularly in extremely dry years. On the other hand, the low degree of fires actually caused by bird hunters has to be recognized.

Statistics for the U. S. Forest Service lands in Montana for 1971 show a total of 674 fires with 24 definitely hunter caused (3.5 percent). Over a 20-year period on the Lewis and Clark National Forest, 2.9 percent of the total annual fires were hunter caused (USFS Region I Records). In 1971, only 0.6 percent of the fires on BLM lands could be attributed to hunters (State BLM Records). Hunters also have aided in the discovery, reporting and suppression of wildfires caused by other means.

The opening of grouse season is usually recommended for the mid-September period -- as weather records show that extreme fire danger is usually past by then. Climatological data for seven mountain and seven prairie weather reporting stations, 1953-1970 (Figure 23) showed that Montana's precipitation rates usually increase during September 11-15, the period which corresponds to the opening of most Montana grouse hunting seasons.

1/ 1968 data unavailable.
2/ Includes: Butte, Darby, Hebgen Dam, Helena, Kalispell, Libby, Missoula.
3/ Includes: Billings, Broadus, Glasgow, Great Falls, Havre, Lewistown, Miles City.

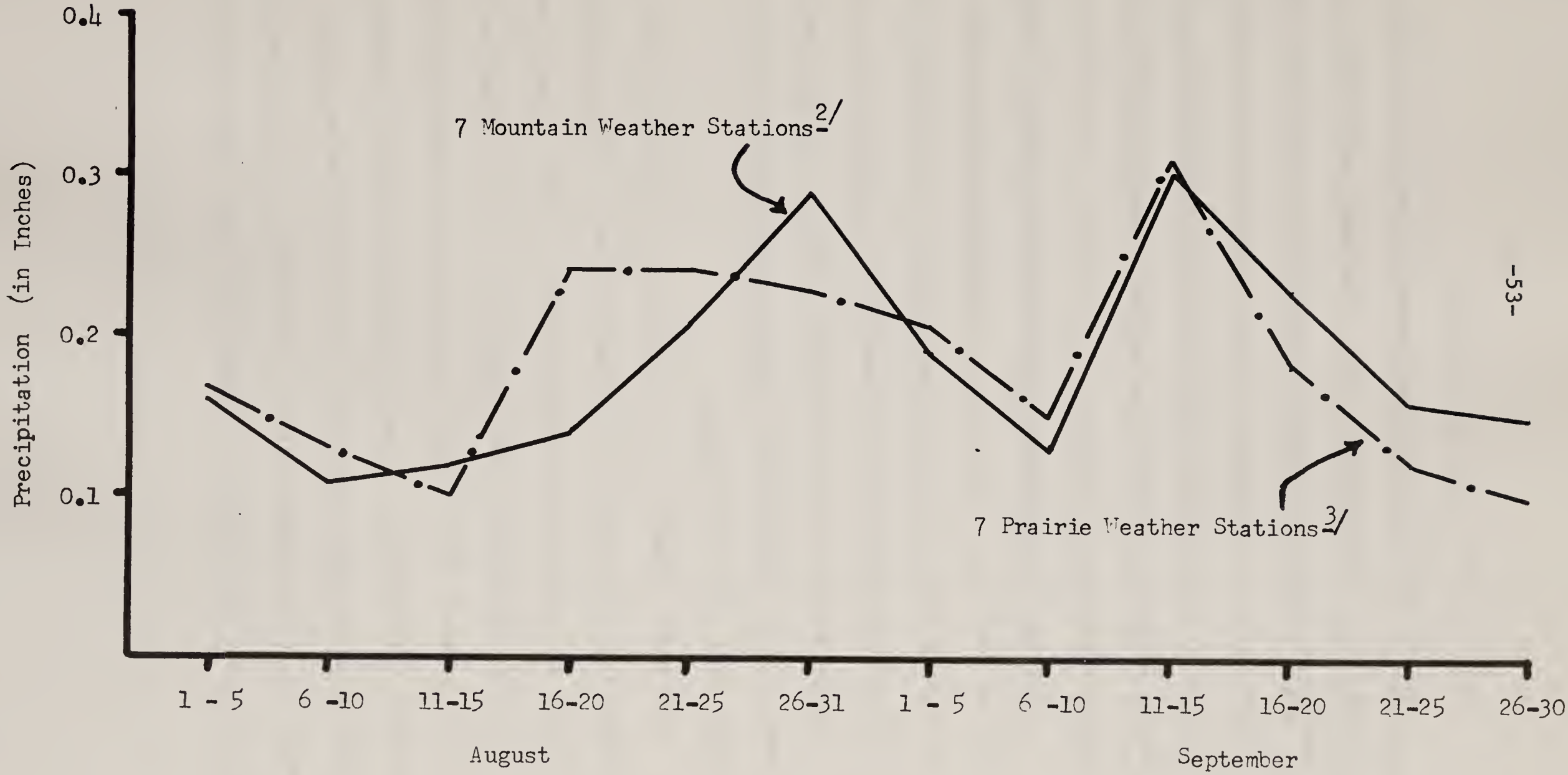


Fig. 23. Average precipitation received at 14 weather stations during 5-day periods, August-September, 1953-1970 1/.

Conflict With Other Land Uses

Direct conflicts can result when hunting seasons are opened on lands having other high intensity uses. The magnitude of these conflicts cannot be determined without dealing with special situations. Virtually any type of overlap could be viewed as a problem by some individual or group. Conflict could occur on recreation areas; livestock grazing on public lands during hunting seasons is viewed as a problem by the hunter; the stockman views the hunting season as a problem.

Closing of the hunting season does not provide a worthwhile solution to land-use conflicts. Such action eliminates the opportunity for responsible law-abiding recreationists to participate in an enjoyable form of recreation. It eliminates opportunity for responsible management of a renewable resource. It further provides opportunity for conflicts with big game populations with domestic crops (depredation) and/or forage resource conflicts with other animals both wild and domestic.

The major segment of the hunting public does not spawn irrevocable consequences on land form or on property owners. Most pursue the sport with an attitude of responsibility and integrity to both. There commonly tends to be an attitude expressed toward undesirable acts of, "Penalize the masses for the acts of a few." This attitude does not provide meaningful solutions to the problems that do exist. Laws should provide means to assess substantial penalties against those committing acts of vandalism or property destruction. It should not be necessary that the landowner or property owner be totally responsible for apprehension. Present-day laws, requiring permission for tres-

pass, impose a penalty for trespass and accomplish nothing along the lines of property damage. Trespass in itself is of no consequence to the environment and of very major consequence to the property owner. The hunter leaves a very insignificant impact on the land as a result of walking into an area and bagging a game bird. The major problems result from his vehicles, or from the negligence of the careless hunter. Efforts need be directed toward correction of the specific problems, not toward blanket regulation against the entire hunting population. Specific problem situations can best be rectified by specific rather than general regulations.

V. BENEFITS

BENEFITS

Hunting is a deep-rooted and traditional human activity which over the years has changed from one of necessity and survival to one of recreation and sport. While the motives have changed, hunting popularity has grown and participation has been increasing (USDI 1966, 1970), and involves a significant portion of the U. S. population. In 1968 approximately 14.9 million Americans hunted, purchasing a total of 20.9 million hunting licenses (USDI 1970). In 1965, 25 percent of all males between the ages of 16 and 34 were hunters (USDI 1966).

To attract this large following, the satisfaction derived from hunting must be somewhat special or unique. Hunting is not a casual activity and often requires special and expensive equipment. The benefits of hunting can be placed into two general categories: 1) the satisfaction as fulfillment of hunters' desires; and 2) the economic impact stemming from expenditures by hunters.

People hunt for a variety of reasons. Probably most important is the recreational aspect -- that is, the value of relieving the monotony and strain of today's pace of living and restoring a capacity to return to one's work with new vigor and dedication. A 1965 hunting survey in Arizona showed 37 percent of the hunters interviewed hunted for recreation (Davis 1967:5). Other important reasons given were bodily health, aesthetics, association, economic and intellectual. Most hunters started hunting before the age of 20 and felt the special skills required to successfully meet the challenge of hunting helped develop the desirable traits of patience, perserverence and moderation (Davis 1967:5-6).

Hunting should be a character-building experience. Pursuit of game in observance of hunting regulations promotes respect for social laws in general. Annual contacts between hunters and landowners should foster mutual respect and understanding for broader, socially based (i.e., urban versus rural) problems. Hunting can be an educational activity by presenting the opportunity to observe living things and their relation to one another and to their environment.

Hunters benefit physically from the fresh air, exercise and relaxation in the out-of-doors. The pursuit of game presents a challenge which appeals to the competitive nature of people, and provides an opportunity to satisfy the urge to pursue and attempt to kill in a manner not destructive to human society. In other words, hunting provides a legitimate outlet for primitive emotions.

Miller and Powell (1942) suggested that recreational, social and aesthetic values of wildlife greatly exceed its economic value. These are intangibles that are difficult to recognize and usually even more difficult to evaluate. A committee of the National Academy of Sciences (1970:47) states that the value of a recreational asset or experience might be high or low, depending on the extent to which it satisfies a social need. Determining a degree of satisfaction would be difficult; assigning it a value would be even more difficult.

Many reasons have been offered as a justification for hunting, ranging from personal pleasure and public health to military preparedness. All of these should be recognized as factors in a broad social value, and that wild-

life is a social asset (Leopold 1953). Wildlife (and hunting) like good public health, is a social asset which cannot be equated to dollar values. Placing economic values on this social asset could lead to underestimating the elusive but much greater social values (NAS 1970:45).

For intangible benefits received, hunters are willing to pay for their hunting experiences, and thus provide economic benefits to others. While willingness-to-pay is not an estimate of true worth, it is useful as an indication of minimum worth. In 1965 the Nation's hunters spent 1.1 billion dollars; license fees accounted for only 6 percent of that total (USDI 1966: 10). Expenditures by hunters can be the life blood of local economies.

In 1965, 10.5 million small game hunters spent $615.2 million or about $4.79 per hunting day (USDI 1966:14) in the United States. Small game hunters spent less than big game hunters; 10 percent less per season and 50 percent less per day. In 1965, Arizona small game hunters averaged $68.49 for the season (Davis 1967:22). In 1954, small game hunters from four western states averaged $37 to $70 per season (Wallace 1956:47). In 1956, New Mexico small game hunters spent $3.5 million (Campbell 1958:24).

In 1960, 146,570 hunters (big game included) spent an estimated $22.7 million in Montana an average of $150 each, or $13.50 for each hunting day (McConnen, no date:6). In 1971, 185,594 hunters undoubtedly spent much more. In Montana, where nearly one out of every four residents is a hunter, the economic impact of hunting must be felt to a certain degree in every community.

There are also several positive economic aspects that are not included in any of the figures previously listed. They do not include any secondary benefits, but only primary expenditures by hunters. A secondary economic benefit

is the cost of providing a service which is purchased by a hunter. There are many hunters, mostly young ones, who hunt non-game animals and are unlicensed. They spend many hours and a few dollars at this pastime. Hunting also effects a certain number of people who are non-hunters; friends and relatives who just go along for the outing. In Arizona, nearly one-third of all small game hunting trips included unlicensed persons and involved more than half a million people (Davis 1967:53). The expenditures of these non-hunters while on the trip are the result of hunting and should be considered in an economic survey. The thousands of pounds of game meat have a definite monetary value, especially to chronic low income families.

The Federal Aid in Wildlife Restoration (Pittman-Robertson) program is supported by a manufacturers' excise tax on sporting arms and ammunition. These funds are apportioned to the states in accordance with formulae based primarily on size, and number of paid license holders, of each state. In addition to other monies generated by hunting activities, this program has put nearly $11 million into Montana's economy since 1946 (Table 5). In recent years this program has contributed over $750,000 annually to the economy of the State of Montana. Participants in Montana's annual hunting seasons thus provide funds directly (license sales) and indirectly (Federal Aid) to be used on a 1:3 matching basis for:

1. Basic research into the habitat requirements and population dynamics of many game animals;
2. Acquisition and development of units of land important to various game animals which provides long-term benefits to other non-game

species as well. All of these animals are available for the enjoyment of *all* Montanans;

3. Statewide surveys of game populations and trends, and condition and trends of habitat.

License sales also provide a major portion of the funds for law enforcement activities designed to more equitably distribute the annual legal game harvests among participants.

Hunting in Montana is big business and a major contributor to the economy of the State. And its value as a social asset is even greater.

TABLE 5. STATE INCOME DERIVED FROM P-R FUNDS AS A RESULT OF HUNTING LICENSE SALES, 1946-1970.[1]

Year	Amount	Year	Amount
1946	$ 56,616	1959	$529,631
1947	117,429	1960	503,631
1948	237,960	1961	424,139
1949	171,641	1962	573,284
1950	268,664	1963	436,480
1951	154,534	1964	398,630
1952	57,134	1965	526,764
1953	283,801	1966	496,155
1954	449,155	1967	591,443
1955	413,612	1968[1]	796,960
1956	475,854	1969	1,326,001
1957	404,249	1970	781,818
1958	468,883		
		25-Year Total	$10,944,319

[1]Data 1946-1967 from Montana Fish and Game Commission Biennial Report; 1968-1970 data are Fiscal Year figures.

VI. SUMMARY STATEMENT

SUMMARY STATEMENT

The Montana Fish and Game Department has the responsibility for protecting and perpetuating the State's wildlife as well as providing for its wise utilization. The primary utilization of Montana's upland game bird resource is obtained through regulated, sport-hunting that provides public recreation and annual harvests of the game bird resource. This Statement has reviewed the expected or possible effects of the annual statewide harvest of upland game birds on the quality of the State's environment.

The environmental impacts created by game bird hunting are primarily associated with the activities of hunters and their vehicles in traveling to and engaging in this type of outdoor recreation. No major problems are expected that would result in significant detrimental effects to the *air, soil, vegetation, water, visual appearances,* or other aspects of the State's environment. Certain minor, short-term effects to some aspects can be expected; many of which can be minimized by continued enforcement and educational programs. Effects on humans will primarily be beneficial; many thousands of hours of healthful outdoor recreation will be provided. A relatively low incidence of injurious and fatal accidents or individual health problems can also be expected. A compensatory degree of similar effects could be anticipated in other outdoor recreations substituted for hunting. No long-term, detrimental effects to the game bird resource itself are expected. Harvests are based on established biological knowledge that portions of wildlife populations can be utilized annually without jeopardizing future populations.

Various problems exist when the public engages in outdoor sports that include private and public lands. These problems are discussed with suggestions to minimize their incidence or magnitude.

The nature of conducting proper game management is such that there will probably always be some degree of discontent from the public regarding its operation. Probably most disconcerting are those who disagree with the concept of hunting itself as a natural human recreation and in their opposition fail to recognize that scientific game management also has the necessary goal of perpetuating wildlife resources for the benefit of all mankind.

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MAILING DISTRIBUTION

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APPENDIX

APPENDIX

Literature Cited

Allen, D. 1954. *Our Wildlife Legacy*. Funk & Wagnalls Co., New York. 340 pp.

Bendell, J. F. and P. W. Elliott. 1967. Behaviour and the regulation of numbers in blue grouse. Canadian Wildl. Service Report Series, No. 4. 76 pp.

Braun, C. E. and G. E. Rogers. 1971. The White-tailed ptarmigan in Colorado. Colorado Division of Game, Fish and Parks. Technical Publication No. 27. 80 pp.

Brown, R. L. 1971. Sharp-tailed grouse. pp. 129-133. *In* Game Management in Montana. T. W. Mussehl and F. W. Howell, (*Eds.*). Montana Fish and Game Dept., Game Mgmt. Div., Helena. 238 pp.

Buss, I. O. 1946. Wisconsin pheasant populations. Wisconsin Conservation Dept., Madison. 184 pp.

Campbell, H. 1958. The economic value of hunting and fishing in New Mexico. New Mexico Dept. of Fish and Game, Bull. No. 7. 35 pp.

Dasmann, R. F. 1964. *Wildlife Biology*. John Wiley and Sons, Inc., New York. 321 pp.

Davis, W. C. 1967. Values of hunting and fishing in Arizona in 1965. College of Business and Public Information, Univ. of Arizona. Prep. for Arizona Game and Fish Dept. 91 pp.

East, B. 1972a. The Big Lie. (Part I). Outdoor Life. June: 65-67, 100, 102, 104, 106.

East B. 1972b. The Big Lie. (Part 2) Four-alarm Fire. Outdoor Life. July: 56-57, 92, 94, 96-97.

Gullion, G. W. and W. H. Marshall. 1968. Survival of ruffed grouse in a boreal forest. The Living Bird, 7:117-167.

Hickey, J. J. 1955. Some American population research on gallinaceous birds. Chapt. 11. *In Recent Studies in Avian Biology*. A. Wolfson *(Ed.)* Univ. of Illinois Press (Urbana). 479 pp.

Jenkins, D. 1961. Population control in protected partridges (*Perdix perdix)*. J. Anim. Ecol. 30:235-258.

Jonas, R. 1966. Merriam's turkeys in southeastern Montana. Montana Fish and Game Department, Technical Bulletin No. 3. 36pp.

Leopold, A. 1933. *Game Management*. Charles Scribner's Sons, New York. 423 pp.

Leopold, A. 1953. *Round River*. Luna B. Leopold *(Ed.)* Oxford Univ. Press. 173 pp.

Leopold, A., T. M. Sperry, W. S. Feeney and J. A. Catenhusen. 1943. Population turnover on a Wisconsin pheasant refuge. J. Wildl. Mgmt. 7(4):383-394.

Mallette, R. D. and H. T. Harper. 1964. Population studies of ring-neck pheasants in California. California Fish and Game 50(4):292-304.

McConnen, R. J. No Date. Economic importance of hunting in Montana. 9 pp. multilith.

Miller, J. P. and B. P. Powell. 1942. Game and wild-fur production and utilization on agricultural land. U.S. Dept. Agr. Circ. 636. 58 pp.

Montana Data Book. 1970. Montana Department of Planning and Economic Development. Helena.

Montana Economic Study, Research Report. 1970. Part I. The Montana Economy. 3 volumes. Part II. The Industries of Montana. 3 volumes. Bureau of Business and Economic Research, Univ. of Montana, Missoula.

Morris, M. S. 1959-60. Range lands. pp. 80-82, *In* The Montana Almanac. Bureau of Business and Economic Research, Montana State University, Missoula.

Mussehl, T. W. and P. Schladweiler. 1969. Forest grouse and experimental spruce budworm insecticide studies. Montana Fish and Game Department Technical Bulletin No. 4. 53 pp.

Mussehl, T. W. F. Feist and P. Schladweiler. 1969. Blue grouse population and life history study. Montana Fish and Game Dept., Job Completion Report. Proj. No. W-91-R-10, Job No. II-C. 17 pp.

Mussehl, T. W. and F. W. Howell *(Eds.)* 1971. *Game Management in Montana*. Mont. Fish and Game Dept., Game Mgmt. Div., Helena. 238 pp.

National Academy of Sciences. 1970. Land use and wildlife resources. 262 pp.

Palmer, W. L. 1956. Ruffed grouse population studies on hunted and non-hunted areas. Trans. No. Amer. Wildl. Conference 21:338-345.

Parker, R. R., C. B. Philip and G. E. Davis. 1932. Tularaemia: Occurence in the sage hen, *Centrocercus urophasianus*, also report of additional cases following contacts with quail, *Colinus virginianus*. Public Health Reports 47(9):479-487.

Southard, A. R. 1969. Soils in Montana. Montana Ag. Exp. Sta. Bull. 621. Montana State College, Bozeman. 42 pp.

Thompson, L. S. *(Ed.)* 1956. Montana Agriculture Basic Facts. Ag. Exp. Sta. and Coop. Ext. Serv. Bull. 293. Montana State Collete, Bozeman. 75 pp.

U. S. Dept. of the Interior. 1966. 1965 National survey of fishing and hunting. USDI--Fish and Wildlife Service, Resource Pulbication 27. 76 pp.

U. S. Dept. of the Interior. 1970. Federal aid in fish and wildlife restoration, 1969. Bureau of Sport Fisheries and Wildlife. 103 pp.

Wallace, R. F. 1956. An evaluation of wildlife resources in the state of Washington. Economic and Business Studies, Bull. No. 28. State College of Washington, School of Economics and Business, Bureau of Economic and Business Research. 61 pp.

Weigand, J. P. 1972. Analysis of upland game bird species, sex and age data--Statewide, 1971. Montana Fish and Game Dept. Job Progress Report Proj. W-120-R-3, Job GB- 2.01. In press.

Other References

Allen, D. L. 1954. *Our Wildlife Legacy*. Funk and Wagnalls, New York. 340 pp.

Allen, D. L. *(Ed.)* 1956. *Pheasants in North America*. The Stackpole Co., Harrisburg, Pa. 490 pp.

Bump, G., R. W. Darrow, F. C. Edminster and W. F. Crissey. 1947. *The Ruffed Grouse--Life History, Propagation, Management*. New York State Conservation Department. 915 pp.

Dasmann, R. F. 1964. *Wildlife Biology*. John Wiley and Sons, New York. 231 pp.

Giles, R. D. *(Ed.)* 1969. *Wildlife Management Techniques*. The Wildlife Society, Wash., D. C. 623 pp.

Hewitt, O. H. *(Ed.)* 1967. *The Wild Turkey and its Management*. The Wildlife Society, Wash., D. C. 589 pp.

Lack, D. 1966. *Population Studies of Birds.* Clarendon Press, Oxford. 341 pp.

Leopold, A. 1933. *Game Management.* Chas. Scribner's Sons, New York. 423 pp.

Montana Fish and Game Commission. Various Dates. Biennial Reports.

_____ No Date. 1971 Supplement to Fish and Game Laws. 209 pp.

Montana Fish and Game Department. No Date. Compilation of laws relating to game and fish, game birds and animals of the State of Montana. Revised for years 1969-71. Mont. Dept. of Fish and Game in cooperation with the Attorney General of the State of Montana. 212 pp.

Mussehl, T. W. and F. W. Howell *(Eds.)* 1971. *Game Management in Montana.* Mont. Fish and Game Dept., Game Mgmt. Div., Helena. 238 pp.

National Academy of Sciences. 1970. *Land Use and Wildlife Resources.* 262 pp.

Patterson, R. L. 1952. *The Sage Grouse in Wyoming.* Sage Books, Inc., Denver. 341 pp.

Public Land Law Review Commission. 1970. *One-Third of the Nation's Land--A report to the President and to the Congress.* 342 pp.